THE IRON TRADE REVIEW

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Our Steel is Needed Abroad

Numerous Inquiries Are Received by American Mills From England, Scotland, Japan and South America for Finished and Semi-Finished Steel

With shipments suddenly terminated by the war, English consumers of steel products who have been dependent upon Belgium and Germany for their requirements now are turning to American mills to meet their needs. Steel manufacturers are receiving numerous inquiries for finished materials, rolling billets, skelp and wire rods for shipment to England and one lot of 10,000 tons of billets is nearing the closing stage. The demand for steel bars from the Pacific coast is surprisingly heavy and New England consumers whose supply from Belgian mills has been cut off are placing orders for their immediate needs with American producers. Inquiries for steel also are being received from South America and Japan, although none has yet been converted into orders. The passage of the shipping bill will relieve the tensity of the export trade situation to some extent, although the available bottoms will continue to restrict shipments. The iron ore mines at Wabana, New Foundland, have closed as the result of the war and Pennsylvania furnaces that use this material on their burdens are replacing this tonnage with New York ore.

Uncertainty of Situation

The uncertainty of the situation has developed an attitude of conservatism on the part of both steel producers and consumers and the almost complete stoppage of exports has resulted in the curtailment of operations in plants engaged in the manufacture of machinery and equipment. The suspension, and in some instances, the cancellation of orders for semi-finished and finished steel have followed, although the tonnage involved is not very heavy. In the Chicago district, the leading producer this week increased operations to 72 per cent, while at Pittsburgh there has been no curtailment of production, contrary reports notwithstanding. The opening of the Panama canal accompanied by reduced rates to Pacific coast points is a factor of no little importance to the steel industry, and the reclamation of a large part of this trade, heretofore placed with English, German and Belgian mills, is foreshadowed.

Ferro Manganese

The partial resumption of shipments of ferro-manganese from abroad during the month of September is promised, although the available tonnage will be considerably below the requirements of the mills. The market has settled to a basis of $102.50 for 80 per cent, seaboard, although one lot of 50 tons was sold at $140 and 300 tons were placed at $110. Ground manganese has been advanced to 7 cents a pound and small lots only are obtainable at this figure. A domestic supply of 20 to 40 per cent ferro-manganese is promised by the operation of a furnace at Dunbar, Pa., on domestic ores. The 40 per cent grade is quoted at $75 and 20 per cent commands from $31 to $35. Domestic spiegeleisen has advanced $3 to $4 a ton, although the supply is sufficient for immediate needs.

Finished Products

Independent wire manufacturers have announced a uniform advance of $1 a ton, although the American Steel & Wire Co. is adhering to lower quotations and there is no immediate indication of higher prices from this source. Eastern mills have marked up black and galvanized sheets $1 a ton and an advance of $2 has been announced by warehouses. Since July, black sheets have been moved upward $4, galvanized $5 and blue annealed, $1. Plates are firm and one eastern mill is quoting 1.40c, Philadelphia, equivalent to 1.25c, Pittsburgh, for fourth quarter delivery. It is reported that a German rail manufacturer has transferred from 30,000 to 50,000 tons of rails for Argentine delivery to American mills.

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Our Over-Sea Shipping

IN THE present endeavor to increase our merchant marine by the admission of foreign-built ships to American registry, it would be a crucial mistake to admit such tonnage to the coastwise trade of the United States. Yet that is what the Underwood bill, as amended in conference, sought to do. It is very strange that the great mass of our people are so unenlightened on the subject of our merchant marine. They do not seem to be able to differentiate between its two great divisions—the coastwise trade and the foreign trade. Our coastwise marine is the second largest merchant marine in the world; but one-half of it is on the Great Lakes. Our foreign marine consists of about twelve ships—half of them on the Atlantic ocean and half on the Pacific.

Since the beginning of our government the coastwise trade has been reserved to the American ship. No ship can engage in it unless actually built in the United States. That provision has been the mainstay of the shipbuilding industry of the United States. Take that prop away and the ship yards of the United States would crumble into decay.

The Panama canal act contained a provision that foreign-built ships not over five years old might be purchased by American citizens and given American register for service in foreign trade only. The Underwood bill, as originally presented, simply struck out the age limit. It is gratifying that the conference amendment has been stricken out and the bill passed as originally drawn. While no company had taken advantage of the provisions of the Panama canal act the situation developed by the European conflict is such that a number of American corporations, already owning ships, will transfer them to American register in order to continue their over-sea trade without unnecessary interruption. Why it should have been seized upon as an opportunity to invade our domestic shipping is not readily understood. It is not conceivable that those who advocate it had any comprehension of the incredible mischief that lay in such an undertaking. Millions, legitimately invested in shipbuilding, were at stake.

The present disturbance of the world's peace exposes the folly of our course in the past. We ought not to be put to any such makeshift; we would not have been had we not been so short-sighted.

Impressed with the vastness of our country, the majority could not appreciate the insularity of our position. Everybody understands that England is an island; few understand that the United States is also an island. The United States is far more insular today than England ever was—and that is the colossal discovery that the farmers of Kansas are beginning to make. Hitherto their grain has flowed freely from their granaries after the harvest. Today it is not moving at all. Trainload after trainload is sidetracked in Kansas because there are no ships to carry it abroad when it gets to the seaboard. Our commerce has backed water all the way to Kansas. The farmer is not getting pay for his grain because the shipper cannot guarantee the safe arrival of the cargo in foreign bottoms, while the most powerful of all the neutral nations, more powerful, in fact, than any of the belligerent nations, has no ships whatever. This European war will mean a great deal in a commercial way to the United States if it simply wakes up Kansas. It has been the people of Kansas and the interior states that have prevented the American nation from developing an adequate merchant marine, because they could not be made to understand that a country with a coast line is not self-contained unless it controls its own avenues of trade abroad. It cannot control them unless it owns its own ships. Its empire ends at the low water mark or the three-mile limit beyond its shores. It is an outstanding fact that the shore line of Japan extends to within three miles of California and Oregon and by the same token the shore line of England begins exactly three miles eastward of New York.

Today is Aug. 20, 1914. Exactly five days ago the Panama canal was opened to the commerce of the world on equal terms at an expense of $400,000,000 to the American people. The trade with South America last year

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totaled $1,665,000,000 and Panama is the gateway to it. This mighty commerce is stagnant, because no ships are available to handle it. Every country in South America is appealing to us for ships. But the golden harvest finds us unprepared. We cannot even take advantage of a waterway that has cost us $400,000,000. Could there be worse condemnation of our short-sighted policy than this?

Would Encourage Tramp Voters

AN ASTONISHING illustration of the limit to which some labor unions will go is furnished by a demand for election law changes in the state of Washington. The Seattle Metal Trades Council, composed of delegates from nearly a score of Seattle unions, affiliated with the Central Labor Council and constituting the metal trades section of that body, has made a formal demand for changes in the election laws of the state that will guarantee the privilege of every voter to cast his ballot at all elections regardless of temporary changes of residence. The argument was advanced that the worker is frequently compelled to travel from place to place in search of a job and though entitled to register and vote in his home city or town, often becomes disfranchised through a temporary change of residence. The council further urges that the law be changed to provide that every citizen registering shall be given a certificate of registration entitling him to vote on all state and national initiative or referendum bills regardless of temporary changes of residence. The resolution requests that all candidates for the state legislature who seek the support of organized labor in the coming fall campaign be called upon to pledge themselves to work for and vote for changes in the law as above set forth.

In other words, the peripatetic workingmen or the tramp is to be given a roving commission to vote when and where he pleases. The proposition is as dangerous as it is ridiculous. It strikes at the very root of honest elections and should be resented by every man in the state who wishes to see the sacredness of the ballot maintained.

Spiking Foreign Competition

THE opening of the Panama canal for commercial traffic, which took place last week, comes at a signally opportune time for domestic iron and steelmakers. With the elimination by the war of the shipments from foreign mills which practically have dominated that zone, the home manufacturers now have a remarkable opportunity to reclaim the lost trade of the Pacific coast. Already they are doing so, eastern Pennsylvania mills especially having made some relatively important sales at good prices to that district.

The one factor, of course, which has restricted the sale of domestic steel products on the Pacific coast has been the long haul and the consequent high cost of transportation. The charge for all-rail delivery from Pittsburgh or of rail and water by way of eastern sea ports has provided foreign makers with a considerable margin in their delivered quotations under which to operate to advantage except in cases where the home mills have pared their prices so severely as to be totally out of line with simple costs.

The opening of a short cut between the oceans through the Panama canal changes the situation materially. Already a rate of $6 per net ton of finished product between New York and Pacific coast ports has been put into effect as against $8 to $11 previously charged by the Tehuantepec route through Mexico or through the Strait of Magellan. This reduction more than wipes out the practically $3 a ton advantage in delivered prices which foreign mills recently have been enjoying on the western seaboard.

With the Pacific trade thrown by extraordinary circumstances into the hands of the home manufacturers, the Panama waterway now appears as the spike by which this business may be tied permanently to the domestic mills. In fact, it is indicated that without the upsetting of the foreign mill situation by the war, the canal route would have so improved the position of the steel manufacturers in this country that they would have been able to meet the invaders of the Pacific coast on an even basis and probably to outquote them.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for August, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for July, 1914.	Average for May, 1914.	Average for Aug., 1913.
Bessemer pig iron, Pittsburgh..	$14.90	$14.90	$14.90	$16.52
Basic pig iron, Pittsburgh.....	13.90	13.90	13.90	15.07
No. 2 Fdy. pig iron, Pittsburgh.	13.90	13.90	14.09	14.71
Northern No. 2 Fdy., Chgo....	14.00	14.00	14.25	15.00
Lake Superior Charcoal, Chgo..	16.00	15.75	15.75	15.00
Malleable Bessemer, Chicago...	14.00	14.00	14.25	15.00
Southern No. 2, Birmingham...	10.00	10.13	10.43	10.88
Southern Ohio No. 2, Ironton..	13.00	13.50	13.50	14.00
Basic, eastern Pa.....	14.00	14.00	14.00	15.00
No. 2X Virginia furnace.....	12.50	12.50	12.75	13.00
No. 2X Foundry, Philadelphia..	14.75	14.60	14.75	15.75
Ferro mang., Balti.....	100.00	37.50	38.50	56.00
Bessemer billets, Pbgh. & Ygn..	20.00	19.30	20.00	26.12
Op. h'th sh. bars, Pbgh. & Ygn.	21.00	20.20	21.00	27.12
Bess. sheet bars, Pbgh. & Ygn..	21.00	20.20	21.00	27.12
Op. h'th billets, Pbgh. & Ygn..	20.00	19.30	20.00	26.12
Steel bars, Pittsburgh.....	1.20	1.11	1.15	1.40
Iron bars, Philadelphia.....	1.25	1.17	1.20	1.37
Steel bars, Chicago.....	1.38	1.25	1.29	1.58
Tank plates, Chicago.....	1.38	1.28	1.29	1.63

	Today's prices.	Average for July, 1914.	Average for May, 1914.	Average for Aug., 1913.
Structural shapes, Chicago.....	$1.38	$1.28	$1.29	$1.63
Iron bars, Cleveland, local del'y.	1.20	1.20	1.20	1.50
Iron bars, Chgo. mill.....	1.07½	1.10	1.10	1.45
Beams, Pittsburgh	1.20	1.11	1.15	1.45
Beams, Philadelphia	1.30	1.25	1.25	1.55
Tank plates, Pittsburgh.....	1.20	1.11	1.12½	1.44
Tank plates, Philadelphia.....	1.30	1.25	1.25	1.55
Sheets, blk., No. 28, Pittsburgh.	1.95	1.80	1.87	2.20
Sheets, blue an., No. 10, Pbgh.	1.40	1.35	1.37	1.65
Sheets, galv., No. 28, Pbgh.....	2.90	2.75	2.80	3.25
Wire nails, Pittsburgh.....	1.60	1.51	1.57	1.66
Connellsville fur. coke, contr....	1.75	1.85	2.00	2.50
Connellsville fdy. coke contr....	2.35	2.40	2.50	3.00
Heavy melting steel, Pbgh.....	11.50	11.55	12.00	12.50
Heavy melting steel, east'n Pa..	11.00	10.50	10.75	11.50
Heavy melting steel, Chgo.....	9.50	9.75	9.94	10.50
Heavy cast, eastern Pa.....	12.25	12.00	12.50	13.25
No. 1 wrought, eastern Pa.....	12.25	12.25	12.50	14.25
No. 1 wrought, Chgo.....	8.50	9.00	8.63	10.50
Rerolling rails, Chgo.....	11.25	11.25	11.25	12.50
Car wheels, Chgo.....	10.75	11.00	11.38	12.50

(For Additional Prices See Page 358.)

Pig Iron Shows No Improvement

Low Prices Continue to Prevail in all Centers and Buying is Limited to Small Lots

New York, Aug. 18.—The domestic pig iron market at New York and surrounding territory and in New England, is practically flat. Whatever inquiry or buying is appearing is for odds and ends and it casts little light upon the question of prices. Some indications have appeared during the past few days, however, which show certain eastern Pennsylvania furnaces have not stiffened in their price positions, at least not for early delivery, and probably would accept the equivalent of $14.20 to $14.45, tidewater, for No. 2X. Other makers are asking from $14.70 to $15.20, tidewater. Other Buffalo makers than those originally announced, have adopted a $14 basis for No. 2X or malleable and some small sales have been made at this figure. It is understood, however, that all Buffalo makers still are not quoting the advance. A lot of 600 to 800 tons of foundry grades for a Newark consumer still is before sellers. An inquiry for 1,000 tons of steel-making iron for Japan has been put out in this market and traders believe that further export negotiations are likely to be opened soon because of the European situation.

Prices Tighten in East.

Philadelphia, Aug. 18.—A gradual tightening of prices is manifested in pig iron in the eastern Pennsylvania district as makers are drawing away from the lowest figures recently quoted and are finding no attraction in business at former concessions. It may be said that the market has hardened at about the average low point of recent selling and that the softness recently so conspicuous in all quoted ranges is disappearing. At the same time the firmer condition of the market is based upon sentimental grounds arising either from present uncertainties or expectations of future betterment and not upon actual new business. Bookings of the week, however, were heavier than in the week preceding. Eastern Pennsylvania No. 2X has established itself more squarely upon a basis of $14.75 to $15, small sales, which is about all there is to the present market, having been made at 25 cents higher than recent schedules. Makers generally now regard $14.75 as the minimum figure. Buffalo foundry and malleable have been sold in this territory at the recently announced advance to $14, furnace, in that district, equivalent to $16.45, delivered. A 500-ton lot of malleable was done at this figure. Virginia iron remains rather soft, $12.50, furnace, for No. 2X being easy and one sale of 300 tons of 3 per cent silicon was made to the Baltimore & Ohio railroad at about $12.25, furnace. The Pennsylvania railroad asks 1,500 to 3,100 tons of 1 to 1.25 silicon and 1,500 tons of Lake Superior charcoal iron for shipment over the last four months to Altoona or Pittsburgh. A sale of 1,000 tons of pipe metal for shipment out of this district is noted. Makers of standard low phosphorus have advanced prices 50 cents to $21 to $21.50, Philadelphia, and have closed small transactions at the new level. Lebanon low phosphorus makers have made no change in their schedule of $17 to $17.50, furnace, and in the week closed one contract for last quarter calling for 4,500 to 6,000 tons on this basis. Basic remains in no demand and is wholly nominal in price.

Inquiry Light at Buffalo

Buffalo, Aug. 18.—The war situation continues to exercise a retarding influence on the purchase of iron. Few orders are being booked and the inquiry for the week has been light. Shipments of iron under contract, however, continues in good volume. Small tonnage lots made up the sales

(*For complete prices see page* 358.)

of the week. One of these, principally foundry iron, was placed at $14.

The interests that have booked large tonnages are quoting lower prices than those whose order books are not so well filled. While a $13 minimum is being asked for No. 2X foundry by one producer, other interests are holding this grade and malleable in small lots at $14 to $14.25 and $14 is the minimum that will be accepted. The range for the week, however, is no doubt $13.50 to $14.25 on No. 1 foundry down to $13 to $13.25 on gray forge, with malleable quoted at $13.50 to $14.25 and basic at $14 to $14.25. No orders are being booked beyond the end of the year.

Pennsylvania Wants Foundry

Pittsburgh, Aug. 18.—In sharp contrast with the market for some finished lines, pig iron in western Pennsylvania and eastern Ohio continues to move along at a slow, monotonous gait. Steel-making grades, in particular, reflect no life, and except for sales of 100-ton lots at current prices, this branch of the market is at a standstill. Foundry grades, comparatively speaking, are in greater demand, but reflect no strength. The Pennsylvania railroad is negotiating for from 1,500 to 3,100 tons of low silicon iron for consumption at its Altoona shops. The Shenango Furnace Co., Sharpsville, Pa., has blown in No. 1 stack, a duplicate of furnace "D", of the Youngstown Sheet & Tube Co., Youngstown; it is probable, however, that the Shenango company will reline one of its furnaces this autumn. Punxy furnace, of the Punxsutawney Iron Co., Punxsutawney, Pa., is being prepared for the torch and its output for fourth quarter delivery is being offered to the foundry trade. One of the two stacks of the Dunbar Furnace Co., Dunbar, Pa., will be blown in at an early date, but will operate on ferro-manganese. The output is being offered by the American Manganese Mfg. Co., Philadelphia.

No Activity at Cincinnati

Cincinnati, Aug. 18.—One southern Ohio furnace is offering occasional lots of No. 2 foundry iron at $13, Ironton, for nearby delivery. Other producers in this district are still holding at $13.50 for this grade, while malleable and basic iron have not declined and are holding at $13.50, Ironton.

A few furnaces in both Alabama and Tennessee have advanced their quotations and are asking $10.50, Birmingham, for No. 2 foundry, for the last half. A few makers are asking $10.75, Birmingham, for this grade, but this price is too far above the market to secure orders. A little furnace iron in both states is still obtainable at $10, Birmingham, for No. 2 foundry, for prompt or last half shipment.

The market is very quiet with demand at a very low ebb, but the feeling among dealers is a little better. A nearby melter has bought 1,000 tons of southern foundry iron and 500 tons of the same grade has been sold to an Evansville, Ind., manufacturer. Inquiry has been made by a Springfield, O., foundry for 600 tons, divided between northern and southern grades.

Foundry Sells in Small Lots

Cleveland, Aug. 18.—Sales of pig iron in this territory are confined to small lots of foundry grades ranging from 50 to 100 tons and almost without exception for prompt shipment. No contracts are being closed and not a single inquiry has been received as to prices for next year's delivery. Cleveland sellers of valley standard low phosphorus now are quoting $21.50 to $21.40, Pittsburgh, and are selling in lots of one or two carloads. In general, the melt of foundries in this locality appears equal to production.

Prices Grow Weaker

Chicago, Aug. 18.—Makers of pig iron in this district find demand and sales much reduced. Foundry work is at a low ebb and the tonnage required is so small that makers are finding difficulty in placing the output of furnaces now in blast. Production of pig iron is now as low as it has been in years, but more or less of this is being piled on account of lack of orders. Although only one furnace has been blown out in recent weeks it would not be surprising if others follow unless conditions change.

Sellers are striving to maintain $14, Chicago furnace, for the remainder of this year and $14.50, for first quarter, but it is believed this figure is being shaded in some cases for prompt delivery.

An Illinios melter is said to have taken 1,000 tons of foundry iron with silicon up to 2.75 at $13.50, Chicago furnace. Quotations on prompt delivery iron are none too firm and with considerable stocks and lack of orders on books every inducement is to shade.

Southern iron apparently may be obtained from almost all sellers on a basis of $10, Birmingham, for immediate delivery and at $10.25 to $10.50, Birmingham, for fourth quarter. Sales are small in this territory and inquiry is almost absent.

Some inquiry for fourth quarter is being received by northern makers and in some cases quotations on this delivery lead to negotiations for the same quotation to carry through first quarter. Probably little tonnage has been sold into next year and for the most part sellers refuse to quote less than $14.50, Chicago, for delivery after Jan. 1.

(*For complete prices see page* 358.)

Pig Iron Quiet.

St. Louis, Aug. 18.—Inquiries for pig iron in the St. Louis market are limited to car lots, and dealers are by no means optimistic. Southern No. 2 is quoted at $14 to $14.50, St. Louis. Northern iron is held at $13.50. Ironton, and $14, Chicago, with virtually no demand.

Southern Market Stronger

Birmingham, Aug. 17.—The iron market at Birmingham is stronger. The volume of business has increased and quotations have strengthened. Southern No. 2 is quoted at $10.25 for third and fourth quarter shipment. Some sales are being made at $10.50 for delivery the latter part of the fourth quarter. One company only is selling for $10, but as far as can be learned, its sales are limited to small lots.

Conservative estimates place total sales in the Birmingham district since Aug. 1 at well over 100,000 tons. A new furnace has been blown in by the Woodward Iron Co., and Sloss-Sheffield officials state that their present furnace capacity is below their sales. Yard stocks are comparatively light. On Aug. 1 there were about 185,000 tons in stock in the Birmingham district.

No effect of the war has yet been felt, but it is looked for by local men within the next two or three weeks. Sales are improving, but they state the improvement is not directly due to the war, claiming that there is a better feeling in general conditions at home.

An interesting development of the past week has been the inquiry from South and Central America for sugar machinery and similar equipment, which heretofore have been purchased from Europe.

At $10.25, one interest has sold 4,000 tons, the larger part of it for delivery into the Chicago district. Another company states that to keep up with its orders it will have to ship 1,000 tons a day for the next two months or more.

The firm of Ludwig & Gee, Harrison building, Philadelphia, pig iron, coke and steel products, has been dissolved by mutual consent and the interests of S. C. Ludwig have been purchased by his partner, Oliver Gee. Mr. Gee will continue the business under the name of the Oliver Gee Co.

Improvement in Ferro Situation

Shipments From Abroad will be Resumed—Operations at Dunbar Also will Relieve Conditions

New York, Aug. 19. (By wire.)—Late advices received today from abroad indicate that while English shipments will be resumed next month under the conditions stated, there is no assurance that consumers will be able to receive deliveries at the date and in the quantity specified in their contract. Eventually, it is believed that all these contract tonnages will be delivered, but the inability to get freight room, as these cable advices now show, makes it probable that the earlier shipments will be prorated and that the deliveries will be spread out. Consumers, therefore, who now are counting upon receiving regular shipments, are likely to be disappointed and this fact will tend to keep the situation in ferro-manganese in further uncertainty.

New York, Aug. 18.—Some clearing of the air for the restoration of shipments of English ferro-manganese to contract buyers, has come through the receipt of cable advises from abroad that deliveries will be resumed in September, provided ships then are available and also that consumers will pay $2.50 additional per ton to cover war insurance risks and freight extras. All consumers with such contracts which specify delivery both over the balance of this and in some cases through next year, readily have agreed to assume the extra cost per ton, especially since the prices of these commitments range from $36 to $38 per ton at tidewater and the market for spot and nearby ferro-manganese at present reaches from $100 to $150 a ton.

In communicating their willingness to ship under the conditions outlined, some of the English makers have offered to sell in this country for nearby shipment, additional tonnage at $102.50, seaboard, and some sales of such material have been closed around that price, deliveries to be made in about 30 days. This action is taken to indicate that English makers have sufficient stocks of ore or finished ferro-manganese on hand to fill their contracts to the end of the present year and even for some time beyond. The position of those buyers with ferro-manganese contracted for, therefore, has been rendered more favorable as far as it pertains to their requirements during the next four to six months. The serious side of the present situation, accordingly, refers to requirements beyond that time, when foreign makers will have exhausted their supply of ore and may still be unable to draw upon the mines in Russia or India.

Shortage of Stocks

While the outlook in ferro-manganese has improved materially through the promise of the resumption of shipments, shortages among buyers who have not contracted for their needs or have low stocks, continue to bring about the payment of high prices for early material. The highest price actually paid, according to a verified sale, has been $140, seaboard, a lot of 50 tons in the Philadelphia market, going on this basis. A sale of about a similar quantity in the same district was made at $125 a few days earlier. Canadian steel makers who found themselves in possession of some surplus have been diverting this material to this country. One lot of 300 tons of this resale ferro was taken by an eastern Pennsylvania steel works at $110, seaboard. Small lots of lump ferro-manganese have sold at 6 cents per pound, or $120 per net ton, and $134.40 per gross ton. Ground ferro-manganese is quoted at 7 cents per pound. Some merchant lots of ferro-manganese are being held by the owners at $175 to $200, but it cannot be established that any sales have been made at these prices. The steamer Rapidan arrived at Philadelphia the past week with 1,500 tons of ferro-manganese on board, which has been applied against regular contracts.

Domestic spiegeleisen, which has been experiencing a brisk movement, has been advanced $3 to $5 a ton to $31 to $33, eastern Pennsylvania, for 16 to 19 per cent and nominally to $35 for 19 to 21 per cent manganese, though it is understood that the supply of the higher grade material has been practically sold out. Some very heavy transactions in spiegeleisen are reported to have been closed by the large steel makers. Representatives of English spiegeleisen state that they are able to make a price of about $35, seaboard, upon this alloy at the present time.

The market for domestic and Canadian, 50 per cent ferro-silicon, has been the most active the past two weeks for some months, due to the fact that foreign shipments having been shut off, buyers are recovering these requirements at home. Domestic consumers have purchased some quantity of foreign material during the past six months. The domestic market remains unchanged at $71, Pittsburgh, or Philadelphia, for over 600 tons; $72 for 100 to 600 tons, and $73 for smaller quantities.

Selling Domestic Ferro

Philadelphia, Aug. 18.—Now having entered the market as an active seller of ferro-manganese and having sold a couple thousand tons of 20 to 40 per cent material to be delivered over the balance of the year, the American Manganese Co. of this city has completed arrangements to start the manufacture of this alloy at the Dunbar, Pa., blast furnace plant about Oct. 1. The furnace will be blown in a week earlier on foundry iron and then changed to ferro-manganese. As generally known, the company will obtain its manganiferous ore from Crow Wing county, Minnesota, on the Cuyuna range. The ore already mined will run from 12 to 30 per cent in manganese. Two cargoes of this ore now are at the dock in Duluth, waiting to be shipped to the furnace, and 30,000 tons additional are on the ground at the mine. If the demand for the company's product continues after navigation on the lakes closes, it is expected to bring down the mineral to Dunbar by the all-rail route.

The company expects that it will be able to manufacture monthly at Dunbar 5,000 to 6,000 tons of 40 per cent and a larger quantity of the lower manganese material. The basis of the sales already made has been $75, at the furnace for 40 per cent, $50 to $55 for the 30 per cent and $31 to $35 for the 20 per cent.

Ferro Situation Acute

Pittsburgh, Aug. 18.—Reports from Philadelphia indicating that English makers are willing to resume shipments of ferro-manganese, if bonuses are paid for war risks and freight advances, have tended to relieve consumers in this section, but the situation still is regarded as serious. Prices have declined slightly at the eastern seaboard for future delivery, but the market for spot material still is high. The American Manganese Mfg. Co., which controls the Dunbar Furnace Co. plant at Dunbar, Pa., is freely offering this alloy, planning to manufacture material ranging from 35 to 40 per cent in manganese from Cuyuna range ores. One of the two

(For complete prices see page 358.)

stacks is being prepared for the torch and will be in operation for fourth quarter delivery.

Several western Pennsylvania steel manufacturers, whose supplies of ferro-manganese are limited, are seriously investigating manganiferous ore deposits scattered throughout the state of Virginia. To what extent relief can be obtained from the Virginian fields is unknown, and nothing definite has been announced with reference to proposed plans. A prominent ore dealer expresses the opinion, however, that it would not be profitable to mine ores in Virginia unless ferro-manganese were commanding abnormally high prices, because of the expense and uncertainty connected with such an undertaking.

Sheet Market is Active

Recent Price Advances Are Being Well Maintained by the Mills

Cincinnati, Aug. 18.—The sheet business continues good and prices have continued to move up during the week. Mills in this territory are now asking 2.15c on black sheets, No. 28 gage, and 3.15c on galvanized No. 28 gage, both Cincinnati basis. With quotations at a safe level, mills are now taking business for 60 days ahead, whereas, last week when lower prices prevailed, they would accept contracts for short periods only. It is expected by the trade that another advance will not occur before well into the fall. Blue annealed sheets No. 10 gage have been a little slower to advance, and are now quoted at from 1.60c to 1.65c, Cincinnati basis.

Sheets Going Higher.

Chicago, Aug. 18.—Makers of steel sheets in this territory have not quoted on their product for fourth quarter, but as the time approaches when a price must be made for that delivery they have practically come to the conclusion their quotation will be on the basis of 2.18c and 3.18c, Chicago mill, for No. 28 gage black and galvanized, respectively. It may be developments of the next 40 days may bring this level before the beginning of fourth quarter, but it is certain no quotation under this level will be made for the final three months of the year.

Black and galvanized sheets, No. 28 gage, for immediate delivery, are still obtainable at 2.08c and 3.08c, Chicago, with a fair volume of business being booked and specifications coming in added volume on older contracts taken at lower prices.

Advances Awaken Interest

Cleveland, Aug. 19.—Continued interest in the eastern Ohio sheet market has been increased by the steady series of price advances and by the wider demand for sheet products which has accompanied the price advances. While for several days the edge of the advance was softened by some makers quoting the advanced figures on a Youngstown base, yet today all eastern Ohio makers are quoting the advance on the Pittsburgh base as follows: Blue annealed No. 10, 1.40c to 1.45c, Pittsburgh; black No. 28, 1.95c to 2.00c, Pittsburgh; galvanized No. 28, 2.90c to 3.00c. Mills report a fair run of specifications coming in since the higher quotation began to be made, this following the advance of sheet bars in this territory to $21, Pittsburgh and Youngstown.

Sheets Continue Upward

Pittsburgh, Aug. 18.—Steel sheets, which first reflected recuperative power the latter part of July, continue their march toward higher levels. Black sheet products have advanced $4, galvanized $5 and blue annealed $1 a ton the last fortnight and indications are that quotations will continue to stiffen. Demand has been satisfactory, some companies describing last week as one of the heaviest in more than a year, and new business has come out in fairly good volume. Mill operations in this district have been increased slightly this week.

Another Advance in East.

Philadelphia, Aug. 18.—So active has been the buying of blue annealed sheets from eastern mills, both for early and forward delivery, that one leading maker again has advanced prices $1 a ton to 1.65c, Philadelphia, or 1.50c, Pittsburgh, for No. 10 gage blue annealed. Practically no new business has been taken on this level, but there was a considerable movement on the 1.45c, Pittsburgh basis. Eastern Pennsylvania makers have been regaining some tonnage along the Pacific coast which formerly was lost to foreign mills. As a result of the better activity in sheets, eastern makers have been operating their finishing capacity at a higher rate and are cutting into some stocks of cold steel.

(*For complete prices see page* 358.)

Tin Plate Higher

Although Pig Tin Slightly Recedes in Price

Pittsburgh, Aug. 18.—Notwithstanding shipments of block tin to this country from England, the situation continues serious and some mills in this district may be embarrassed unless relief is obtained shortly. Mill managers are exerting every effort to conserve what supplies of metal they have on hand, and plates are not being tinned unless actually required for immediate shipment. As yet no plants have been closed, but some of the small ones have almost exhausted supplies. Scarcity of pig tin has strengthened quotations for finished products, some material selling as high as $3.75 a box, or 50 cents a box above the minimum market price a few weeks ago. Because of abnormal conditions, all quotations are regarded as nominal.

Pipes and Tubes

Some Orders For Oil Country Goods Are Being Cancelled

Pittsburgh, Aug. 18.—Tubular goods are unchanged, being included with the few finished products that have failed to register either actual or sentimental strength. Discounts are reported to be well maintained, but suspension of operations in the oil country regions has resulted in numerous cancellations for all grades of oil country goods, including tubing, casing, drive and line pipe. The Logan Natural Gas Co. has purchased about seven miles of 12-inch line pipe, and an indefinite inquiry is before the trade for 10 miles of 8-inch line pipe. Boiler tubes continue quiet and irregular.

Building Activity

Big Increase Over Operations Last Year

As an indication of general business operations figures on building activity based on permits issued in various principal cities of the United States show an increase of 15 per cent over the corresponding month last year. The increase is general in all parts of the country, and such cities as show a decrease from last year's figures are scattered widely.

The south made remarkable gains and the Pacific coast also shows considerable increased activity compared with last year. Statistics gathered by *Construction News* show permits were issued in 79 cities for the construction of 19,786 buildings at a cost of $68,699,255, compared with 18,526 buildings costing $59,435,000 last year.

War Helps Steel Bars

Belgian Mills Unable to Ship Bars to New England and Business Placed with Domestic Mills

New York, Aug. 18.—Belgian makers of steel bars who had booked fair tonnages for delivery to eastern seaboard points, especially to Boston, find this business wiped out because of the war and their inability to make shipments from Antwerp. In some cases, representatives of these mills have been replacing these orders with domestic makers. Under present conditions, foreign bars are eliminated completely from the eastern coast market. The movement of specifications against domestic steel bar contracts from this district is holding up pretty well, but there is little or no new business. Makers uniformly are quoting 1.36c, New York, or 1.20c, Pittsburgh.

Bar Specifications Are Good.

Philadelphia, Aug. 18.—Consumers of steel bars in this district are specifying quite briskly against contracts closed before the recent 1.20c price went into effect. Some of the railroads have been more active in ordering in steel, including the Baltimore & Ohio. There is very little new business moving at this time as buyers are well covered. All the leading makers, however, are holding for 1.35c, Philadelphia, or 1.20c, Pittsburgh. Some manufacturers of cold-rolled shafting have posted no advances as yet and still quote former discounts.

Bar Price Doubt Dispelled

Cleveland, Aug. 19.—Adherence to the price of 1.20c, Pittsburgh, for steel bars in eastern Ohio appears to be firm and general. Some doubt was expressed a week ago by prospective buyers that this quotation would be adhered to for good specifications, but this doubt seems to have been dispelled. Another municipal project includes a sewage disposal plant to be built at Newburgh Heights, the contract for excavation for which has been awarded to Charles Fath & Co. at their bid of $94,288. It will likely require a considerable tonnage of reinforcing bars, but the requirements have not yet been made public.

Far West Wants Bar Steel

Pittsburgh, Aug. 18.—Pacific coast consumers of steel bars, many of whom have been obtaining tonnages from Europe, now are besieging local mills for quotations. Although not many quotations have yet been made on inquiries from the far west, there is an apparent disposition to insist upon obtaining the "going" market price in this district for such shipment. As mentioned elsewhere in this issue, inquiries have been received from England and Canada for bar steel, and other finished products. The prevailing 1.20c quotation appears to represent the market for third quarter. Bar iron is nominally listed at a range from 1.20c to 1.25c, but is stronger, at least sentimentally, than a week ago.

Advance Well Maintained.

Chicago, Aug. 18.—Users of soft steel bars apparently have found the recent advance to 1.38c, Chicago, is real and some business is being booked on this basis. The aggregate is not heavy, as no large projects are under way but the new business is sufficient, added to tonnage being specified on old contracts to make the mills feel more comfortable.

Agricultural implement makers who did not cover their requirements before the European war started are somewhat backward about obligating themselves and no new business is being taken from this source. This has had some effect on the demand for rerolling steel. New business is being taken at 1.38c, Chicago, and no evidences are found of any mills shading this figure.

Iron Bars Firmer.

Chicago, Aug. 18.—Makers of iron bars find it easier to dispose of tonnage at 1.10c, Chicago mill, and 1.07½c is the absolute minimum, while occasional small sales are booked at 1.12½c. The tonnage of the latter, however, is small and the greater portion of business is done at 1.10c, the minimum being obtainable only on unusually attractive orders.

Bars Firm at Buffalo

Buffalo, Aug. 18.—Specifications on bars, shapes and plates were good during the past week, with a little better miscellaneous inquiry noted. Prices are being held firmly at 1.20c for immediate needs. No contracts are being made beyond the current quarter at this figure. Some business in bars and structural has been booked for fourth quarter at 1.25c. Reports from across the border indicate a resumption of activity in the Canadian market. The present volume of business from the Dominion, however, is small.

(*For complete prices see page* 358.)

Advancing Bar Iron.

Philadelphia, Aug. 18.—Manufacturers of bar iron in eastern Pennsylvania are putting up prices in line with the advances recently announced in steel bars. Some of the plants now quote from 1.20c to 1.25c, mill, or 1.27c to 1.32c, Philadelphia. Business continues a little more active.

Hoops, Bands and Shafting

Pittsburgh, Aug. 18.—Hoops and bands have strengthened slightly the last few days, minimum quotations having disappeared. Shafting is being held at 66 per cent off list for prompt delivery, and $1 a ton above that figure is being obtained for future shipment. The European war has made cotton exports rather uncertain, but cotton tie makers do not expect to be affected. The bulk of the 1914 cotton tie tonnage was sold when prices were announced in July.

Warehouse Sheets Advance

Cincinnati, Aug. 18.—Warehouse gave notice Saturday of an advance of $2 per ton in the price of steel sheets from store. This brings the quotation for No. 10 gage blue annealed to 1.95c, No. 28 gage black to 2.55c and No. 28 gage galvanized to 3.55c. Quotations on other iron and steel products from store remain stationary.

Although warehouse business is not as brisk this summer as usual, the improvement noted during the past two months has not fallen off, although recently there have been days when orders have been extremely scarce. This spotty condition has not affected the general volume of business, however, and as a rule it is showing a slight increase from month to month.

Warehouse Business Better

Cincinnati, Aug. 18.—Warehouse business is much better. One large warehouse reports good contracts during the past few days on twisted reinforcing bars and building materials in general. Dealers state that the recent stiffening in mill prices also has had a good effect upon those quoted by warehouses. No change in prices

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Officers and employes of the Inland Steel Co., Chicago, who could be spared from the offices and mills, picnicked Monday, Aug. 17, at Michigan City, Ind. This is the annual picnic given by the company to its employes and the works were idle excepting the blast furnace.

Plate Prices Maintained

No Large Tonnages Are Being Placed, but Inquiry for Western Shipment Good

Pittsburgh, Aug. 18.—The prostrate condition of industry in Europe, caused by the war, has thrown consumers dependent upon that continent for iron and steel products into the markets of the United States, and the Pittsburgh district appears to be receiving its quota of inquiries. Manufacturers in England have been cabling and writing local sales managers for quotations on plates, skelp, shapes, bars, wire, etc., but have not received many definite responses from this section, it being apparent that mill managers prefer to await developments. Canadian and Pacific coast interests also have been asking for material, and manufacturing interests in this district feel confident they ultimately will benefit as a result of the war. Belligerent countries contribute approximately 50 per cent of the world's production of iron and steel products, but consume a relatively small portion of their output. If bottoms can be obtained, and the safety of cargoes reasonably assured, iron and steel plants in this country hope to increase the volume of their export trade, especially to South American points. Plates are being held at 1.20c by all leading makers, and 1.25c is being asked for shipment after Oct. 1. New buying has been light and specifications show no improvement, due to the enforcement of conservative policies by buyers and sellers.

Plate Market Steady.

Chicago, Aug. 18.—No features have appeared in the market for steel plates during the past week, this variety of finished steel being a trifle slower than bars and shapes, possibly due to lack of new car purchases. Temporary withdrawal of the Southern Pacific inquiry for about 4,000 box cars has had a somewhat depressing influence, but no difficulty has been experienced in obtaining 1.38c, Chicago, on such tonnages of plates as have been sold.

Eastern Plate Tonnage Better.

Philadelphia, Aug. 18.—Betterment of mill tonnage appeared with certain eastern Pennsylvania plate makers the past week and in one case was marked. Pacific coast business helped to swell the total, one maker receiving 1,500 tons from that territory. Shipyards released some good-sized specifications and the Gulf Refining Co. is credited with having closed on an inquiry for 2,000 tons for Texas delivery. Much of the week's business, however, was small. Eastern shipyards are figuring upon one to seven vessels of a certain type which will require 1,000 tons of plates each. Plate buyers still show considerable desire to place contracts and one maker reports having closed some such tonnage for fourth quarter at 1.40c, Philadelphia, or 1.25c, Pittsburgh. On the run of orders the mills are able to obtain the new price of 1.20c, Pittsburgh, but on an attractive specification for early delivery 1.15c, Pittsburgh still can be done with certain producers.

Wire Products Advanced

$1 a Ton—Independents Mark Up Prices Although the American Steel & Wire Co. Holds Former Base

Pittsburgh, Aug. 18.—The Youngstown Sheet & Tube Co., advanced wire nails and plain wire $1 a ton and woven wire fence one-half of one point Aug. 17, and nearly all the independents adopted higher figures the following day. The new prices place wire nails at $1.60 a keg and plain wire at $1.40. The American Steel & Wire Co. probably will formally adopt advanced figures before the end of the week. The last previous advance was announced July 18, when the American company withdrew all quotations below the basis of $1.55 for nails. There has been some demand for wire for shipment to England, but wire exports to all quarters of the globe have been suspended as a result of the war.

Wire Products Advanced

Chicago, Aug. 18.—Although independent makers of wire products have announced quotations $1 per ton higher than those previously ruling, the leading interest has not yet changed its schedule and inquiry fails to reveal its probable action under this circumstance. Announcement by the Youngstown Sheet & Tube Co. of this increase has been followed by practically all other independent makers, but up to this time the leading interest has retained its former schedule.

Demand Continues Good

Buffalo, Aug. 18.—The demand for wire in the Buffalo territory is strong and in keeping with the general demand noted so far this month throughout the country. With prices held firmly at 1.35c on wire and 1.55c on nails by the leading interest and an announced advance of $1 per ton over this figure by independent sellers, it is figured that requirements for the balance of the year cannot be placed to better advantage than now. Consumers are beginning to realize that the European war situation has completely nullified the effects of the tariff and hereafter will have to depend on the domestic supply entirely.

No Advance by American

New York, Aug. 18.—The American Steel & Wire Co. as yet has not followed the action of certain independents in advancing wire prices $1 a ton. The leading producer still is quoting 1.55c, Pittsburgh, on nails and 1.35c on plain wire. Specifications for wire products from domestic consumers have been equal to the active movement of July, but export shipments constituting practically 15 per cent of the country's tonnage, are suspended. Some of the eastern manufacturing buyers have been placing good-sized orders.

(*For complete prices see page* 358.)

Manganese Ore

From Brazil To Be Shipped in Increasing Tonnages

New York, Aug. 19. (By wire.)—The report generally circulated that the United States Steel Corporation has purchased 50,000 tons of spiegeleisen from domestic makers for next year's delivery, proves unfounded, the Corporation not buying spiegel because it is amply supplied. Shipments of manganese ore from Brazil to this country are being increased by the Corporation. Some tonnage regularly has been coming in from that country, but not in the large tonnages now arranged for.

No definite information has been obtained at Pittsburgh with reference to a proposed steel car works, which may be built, Youngstown papers say, near Sharon. Youngstown dispatches admit the reports can not be confirmed.

No Improvement in Scrap

All Centers Report Low Prices and Transactions Cover Immediate Needs Only

Chicago, Aug. 18.—Although quotations on iron and steel scrap in this territory are largely nominal, the general level appears to be lower than last week. Accumulations are unusually large and railroads continue to offer considerable tonnage, while demand from consumers is light. As a rule, sales are made because holders must move their material and prices suffer correspondingly.

Lists offered by railroads and now before purchasers follow: Illinois Central, 5,500 tons, including 1,000 tons of long steel rails; C., St. P., M. & O., 1,000 tons; C., M. St. P., 2,000 tons; Frisco railroad, 490 tons; Queen & Crescent, 45 tons, and the Wabash, 36 tons.

Dealers Have Hopes.

Cincinnati, Aug. 18.—A ray of hope in the iron and steel scrap market has come from the fact that rolling mills in this territory are now operating at almost full capacity in all departments, and are fast using up the surplus material in their yards. None have been buying in large quantities recently, but if the present active trade in sheets continues, it is expected that the mills soon will begin contracting for future requirements.

Scrap Continues Dull

Cleveland, Aug. 19.—Dealers report little activity in this market and prices remain on the same level as for the past fortnight. The Otis Steel Co. is not taking steel material shipments at this time and the Upson Nut Co. has limited receipts. Since local rolling mills have not improved their rate of operations much, if any, the demand for rolling mill grades have not improved.

Moving Carefully in East

Philadelphia, Aug. 18.—A disposition to pick their way and go slowly is shown by both buyers and sellers of old material in eastern Pennsylvania. Buying by consumers is restricted and the brokers are not willing to make short sales without a wide margin. They are taking pains, however, to cover old orders and the underlying note of the market is one of greater firmness. One eastern Pennsylvania steel maker has been paying $11, delivered, for heavy melting steel in 1,000-ton lots, and has purchased several thousand tons. Small sales of steel to brokers at $10.75, delivered, are noted. Turnings are stronger, wrought scrap has a better market and it is understood recent figures for low phosphorus could not be duplicated.

Heavy Melting Steel Firm

New York, Aug. 18.—The same disposition among buyers and sellers to move slowly characterizes the old material market in metropolitan territory. Dealers report a little more stir among consumers in the way of inquiry, but they are taking no chances in committing themselves for forward deliveries, except at considerable advance, owing to the uncertainty that overhangs the situation. As a result, little business is developing. Some dealers declare they would not sell a round lot of heavy melting steel under $11.50, delivered eastern Pennsylvania. The temporary closing of the John W. Roebling's Sons steel works, at Roebling, N. J., has been noted in the market.

(*For complete prices see page* 358.)

Canadian Ore Miners Idle

Demand for New York and Pennsylvania Ore Increases—August Lake Shipments Probably 6,000,000 Tons

New York, Aug. 18.—The Wabana, Newfoundland, iron ore mines of the Nova Scotia Steel & Coal Co., which have been shipping considerable quantities to eastern Pennsylvania furnaces in recent years, are being shut down because of war conditions. Last year these mines shipped to the United States about 205,000 tons and in addition, delivered about 300,000 tons abroad. There have been no purchases of this ore by eastern Pennsylvania furnaces for this year's delivery and such shipments as now are being made to this country represent deferments from last year's contract. The steamer Jethou docked at Philadelphia the past week with 6,500 tons to apply against these old contracts. One other cargo yet is to be delivered to this country. In 1912, the Wabana shipments to the United States were 170,000 tons; in 1911, 185,000 tons; in 1910, 220,000 tons, which was the high mark, and in 1909, 215,000 tons. Another cargo of Chilean ore consigned to the Bethlehem Steel Co., also has arrived at Philadelphia. New Jersey and New York State miners of local ores have been making sales in increased volume to eastern Pennsylvania furnaces during the past two weeks. These ores have sold at approximately seven cents per unit, delivered in the Lehigh and Schuylkill valleys. In some cases, good-sized tonnages were involved in these transactions.

August Shipments Heavy

Cleveland, Aug. 19.—Ore shipments during August probably will exceed 6,000,000 tons, which will mark the banner movement for the year. Dispatch is so wonderfully efficient that practically all of this ore is being carried in vessels belonging to shippers. Wild cargoes are scarce. It is not an uncommon occurrence for a vessel to make a round trip to the head of the lakes in ten days, carrying cargoes both ways. This means handling 10,000 tons four times and traversing meanwhile nearly 2,000 miles of waterway. It is doubtful if elsewhere in the world such dispatch is obtainable. Ore shippers do not look for any improvement in the trade this season and some of them are quite willing to defer further negotiation until next spring. Furnacemen exhibit no desire to purchase ore until there is some demand for pig iron. The ore movement will close early and the season's total shipments will probably not exceed 33,000,000 tons.

Increased Activity

Of Blast Furnaces and Mills in Chicago District

Chicago, Aug. 18.—Operations of steel mills in this territory are slightly heavier this week than last, the leading interest operating one plant at 72 per cent capacity and another at about 65 per cent. In the latter 26 open-hearths out of 42 are active and 15 blast furnaces are in blast out of 25 in this territory.

The skelp mill of the Carnegie Steel Co., at Farrell, Pa., which has been idle several weeks, resumed operations Aug. 17. The plant of the company at Sharon continues idle.

Machines and mechanical operations must be fool proof. You cannot assume that the man who will operate them will use any common sense.

Effect of War on British Trade

A Staff Correspondent Draws an Intimate Picture of Conditions in England With Particular Reference to the Iron Industry

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Aug. 7.

Great Britain, for the first time in 99 years, is learning by experience what a general European war, with England engaged in it, means to national industries. This time last week Great Britain still was making heroic efforts to secure European peace. Today she is one of the principal protagonists in a war in which all the great powers of Europe are fighting, and in which some eight nations in all are engaged. This is the fourth day of the war as far as Great Britain is concerned. Lord Kitchener has taken over the control of the war office from the overburdened hands of the premier, Mr. Asquith, and has asked for half a million additional men. Yesterday, parliament without a word of question granted this request and, with the same unquestioning acquiescence, voted over $500,000,000 for war purposes.

Finances Tided Over.

Thanks to the energetic and prudent measures of the government and the patriotic co-operation of men of all classes and all parties, the financial crisis has been tided over with the minimum of inconvenience and an almost total absence of panic. Today the banks, closed by the royal proclamation since Saturday, have reopened and are at present paying out in gold and silver for all the immediate needs of their customers. Long lines of motor cars from the "black country" were to be seen this morning outside the banks, and departing with the cash to pay the men who have been keeping furnaces and mills going during the week, as far as was necessary at a time when in most of the manufactories of the district a week's closing has been the rule. A large supply of paper money, from this time constituted legal tender, is in preparation, but no serious shortage of gold for foreign business is expected. There has been a momentary panic among householders as to food supplies, but this is practically over. The government announces that the wheat supply already in hand or assured is good for 20 weeks, and; with the co-operation of the leading provision firms, maximum prices have been officially prescribed at standards which will involve far less hardship even to the poorest, than was at first anticipated.

All classes are co-operating with the greatest of good will for national defense and mutual aid. Government has undertaken the insurance of British shipping against war risks, not only to assist in preserving the food supply, but also to keep British commerce going as far as possible. Catholics and Protestants in Ireland have dropped their long-standing feud and jointly have guaranteed to guard their land so as to set free the army to fight against only foreign foes. Today it is announced the dispute in the building trades, which threatened to involve the whole kingdom, has been composed so there may be no industrial strife in the present crisis. The miners and the railway men may be relied upon to follow the same patriotic course. Britain, in fact, is ready at all points to face not only the military and naval exigencies of the situation, but also its commercial and social perils. Her confidence has been strengthened and her spirits cheered not only by the sympathy of her colonies, but also by the messages of good will which have come from America, and the trust that from that quarter all the aid which a neutral state may render to a kindred people in mitigating the hardships of war will be forthcoming.

How War Affects Iron Trade.

While the outlook for all British trades, in spite of all that fortitude and foresight may do, for the time by no means is bright, the war, it is already evident, will not be altogether a misfortune for the iron and steel trades. Coal shipments have been stopped, home industries may be expected to be plentifully and cheaply supplied with fuel. The speeding up of warship and armament work is already making not only the ship yards but Sheffield and other centers exceedingly busy. The Middlesbrough and Glasgow pig iron markets have been closed all the week, owing to the holiday extension of home business and the total stoppage of shipping trade, but they have reopened today. The report just wired here from Glasgow states: "Market strong for Cleveland, but no business concluded." Cleveland—Buyers, cash, 51s 3d ($12.30), one month 51s 5d ($12.34), three months 51s 6d ($12.36); sellers, cash 51s 6d ($12.36), one month 51s 9d ($12.42), three months 52s ($12.48). West Cumberland hematite, settlement price, 61s ($14.64). Stocks at Middlesbrough have increased today by 515 tons.

Thursday is iron market day in Birmingham, and yesterday the exchange was open for business as usual. Birmingham, therefore, was the first iron center to realize the effect of the war on markets. In everything there was a boom, and for about half an hour there was a rapid rise of feverish excitement, which at the end of that time suddenly ceased. Buyers of all kinds of material have been going on short stocks for so long that calls for supplies, in spite of recent slackening of trade, were urgent. Sellers came prepared to get better prices, but they were taken by surprise by the strength of the demand. Steel sections had been put up $2.50 on the Saturday, with proportionate advances on other materials; $2.50 further advance was demanded yesterday, and was obtained as far as any sales were made. The resulting advance in sheet bars, together with the impossibility of obtaining spelter has caused galvanizers to prolong their works' holiday for a period at present undefined, and representatives of the principal firms on yesterday's market declared all recent quotations withdrawn.

The pig iron producers and holders got their long expected advance and a good deal more. Prices went up by from $1 to $3, and then vendors declared themselves off the market until next week. The stoppage of continental supplies will mean the crippled, and in some cases the temporary, stoppage of a good many local works in various departments of the iron and steel trades. It has done a good turn to home producers of raw and finished and semi-finished material. Yesterday common bars went up $4 and the sellers left the market to play, as they hoped with advantage, a waiting game. The Marked Bar Association, whose prices were already pretty high for recent conditions, did not declare any advance, but one may be expected shortly. The Gas Strip Association met and decided to suspend for a week all selling. It is expected they will declare an advance of at least $2.50 next week. Manufacturers of best iron have received notice from the war office and the admiralty to push on deliveries with all possible speed. The possibility of having to resort to the United States for pig iron, steel and

other supplies was one of the topics of yesterday's Birmingham market.

No Finished Steel Quotations.

As regards manufactured iron and steel in the northern markets, quotations at this moment would be utterly unreliable. A steady diminution of employment was anticipated a week ago, but the situation is changing from hour to hour and next week may see different departments a variety of developments ranging from a boom to a slump. The steadiness of pig iron in the north by this morning's market reports, which gave practically last week's prices, cannot be regarded as any criterion. All one can say is that prices today for raw and for finished material are anywhere from $2 to $5 above last week's, and that in the majority of cases sellers both here and in the north are at the moment insisting on cash for immediate delivery. Forward contracts everywhere except where business relations are continuous are at present absolutely declined.

Structural Material Quiet

The Financial Situation Retards the Placing of Business

Pittsburgh, Aug. 18.—Although the general financial situation in this country is regarded as sound, the adoption of rather unusual measures to maintain the financial equilibrium of the money market has had its depressing effects upon the iron and steel market, and it is probable the market for structural material will be quiet until the return of more normal conditions. Numerous structural projects have been temporarily abandoned, promoters preferring to await developments. Structural shapes are being held at 1.20c by leading makers for third and 1.25c for fourth quarter delivery. Inquiries for shipment to England, Canada and the Pacific coast have been numerous since the outbreak of hostilities abroad.

Structural Business Light.

Chicago, Aug. 18.—Structural lettings in the west the past week were extremely light as to tonnage, the largest being for 348 tons. The recent advance in shapes to 1.38c, Chicago, probably has had some effect on new projects and uncertainty as to financing may have prevented others from maturing.

Approach Contract Stage

Cleveland, Aug. 19.—Several building projects in this city are approaching the contract stage among others being that of the hospital building proposed by the Jewish Hospital Association for which plans are being drawn by George B. Post & Sons. The buildings will be erected between Ansel road and E. 105th street and the group of buildings are estimated to cost $400,000. The plans will be passed upon shortly, but so far intimation has not been given contractors.

While most steel companies are holding firmly to 1.20c for shapes in this territory, there is at least a suggestion in the present market situation of a tendency toward soft spots in both the shape and plate market in some parts of eastern Ohio. Contractors have endeavored to secure concessions by offering good tonnages of plates at market and shapes at the former price of 1.15c and vice versa, but such tempting offers have been refused by some of the larger companies.

Shape Prices Seem Firm.

Philadelphia, Aug. 18.—Apparent firmness at 1.35c, Philadelphia, or 1.20c, Pittsburgh, characterizes the present price situation among eastern Pennsylvania structural shape makers. Certain of these mills have taken some good-sized orders on this Pittsburgh basis, especially for Pacific coast delivery, as noted, but in this immediate district the new business offered is light and the price situation is not conclusive. Fabricated awards are few and the inquiry is light.

Slightly Better at New York

New York, Aug. 18.—A slight change for the better has appeared in the structural steel situation at New York City and vicinity which has been pretty stagnant for several weeks. Both awards and new inquiries for fabricated work have expanded somewhat during the past few days, although conditions are by no means as active as they were several weeks ago before financial arrangements were upset. Shape prices at New York City, apparently, are firm at 1.36c, delivered, or 1.20c, Pittsburgh, although there are some cases where mills still have outstanding lower prices which were put out before the recent advances and have been allowed to remain open. Eastern Pennsylvania mills continue to book some good orders for Pacific coast delivery.

CONTRACTS AWARDED.

Chicago & Illinois Western Railroad Co., girders, I-beams and columns, 238 tons, to Chicago Bridge & Iron Co.

Wakefield Iron Co., shop building, power plant and hoist houses, Wakefield, Mich., 103 tons, to Worden-Allen Co.

Chicago, Milwaukee & St. Paul Ry. Co., Winnebago avenue subway, Chicago, 128 tons to Wisconsin Bridge & Iron Co.

Clackmas county, Ore., two 210 foot P. C. spans, 115 tons, to the Milwaukee Bridge Co.

Multnomah county, Ore., bridge over Sandy river, 158 tons to Milwaukee Bridge Co.

Stanuslaus county, Cal., two 200-foot spans over Tuolumne river, near Waterford, 125 tons to American Bridge Co.

State Bank & Trust Co. building, Sioux Falls, S. Dak., 348 tons to Modern Steel Structural Co.

Elks' Club building, Dubuque, Ia., 123 tons to Worden, Allen Co.

The Bates & Rogers Construction Co. has been awarded the contract for the Brooklyn-Brighton bridge at Cleveland. This involves about 1,200 tons of steel reinforcing bars and the contractor has let this to the Corrugated Bar Co., Chicago.

The American Bridge Co., contract No. 109, New York State Erie barge canal, bridge over Mohawk; 1,400 tons.

The American Bridge Co., contract No. 118 New York State-Erie barge canal, bridge at Amsterdam; 900 tons.

Hamilton Bridge Co., Hamilton, Ont., new Hamilton hotel, Hamilton, Esenwein & Johnson, Buffalo, architect; 1,200 tons.

Bridge over New York State Barge canal at Amsterdam, N. Y., 900 tons awarded to the American Bridge Co.

Apartment house at Ninety-seventh street and West End avenue, New York City for Princeton Construction Co., 900 tons, placed with the Passaic Structural Steel Co.

Apartment house for the Riverside Viaduct & Realty Co., 146th street and Broadway, New York City, 500 tons placed with the Harris H. Ures Iron Works.

Highway bridge over the Susquehanna river at Wyoming, Pa., 860 tons awarded to the Penn Bridge Co.

Bridge for Norfolk & Western railroad at Tug River, W. Va., 400 tons awarded to the Virginia Bridge & Iron Works.

Inspection building for the Pennsylvania railroad at Paola, Pa., 400 tons, erection awarded Brann & Stewart, Philadelphia, and fabrication will be done by McClintic-Marshall Co.

Apartment house for Milligan & Moeller, Eighty-sixth street near Riverside Drive, New York City, 1,000 tons, awarded Hay Foundry & Iron Works.

Apartment house for Essie Construction Co., Ninety-sixth street and West End avenue, New York City, 750 tons, awarded Passaic Structural Steel Co.

Apartment house for Bing & Bing, Sixty-sixth street, New York, 750 tons, awarded Passaic Structural Steel Co.

Pier shed East river, New York City, for New York, New Haven & Hartford railroad, 400 tons, awarded American Bridge Co.

Extension Max Ams Machine Co. plant, Bridgeport, Conn., 400 tons, awarded Eastern Bridge & Structural Co.

CONTRACTS PENDING.

Transfiguration Roman Catholic church, Buffalo, bids being received; 250 tons structural steel.

Hanover street bridge, Baltimore, for the State of Maryland, 2,400 tons. H. P. Con-

verse & Co., Boston, awarded general contract. Steel work not yet placed.

Infants' Home and Maternity hospital, Our Lady of Victory church, Lackawanna, N. Y. Bids soon, about 200 tons structural.

Public School 66, City of Buffalo, bureau of buildings, bids soon; about 200 tons structural steel.

Penn Bridge Co., Beaver Falls, Pa., low bidder, bridge at Charlotte, N. Y.; 1,000 tons structural.

Highway lift bridge over the Gennessee River at Charlotte, N. Y. 1,000 tons Penn Bridge Co. reported low bidder on one design.

Freight line bridge for Pennsylvania Lines West over the Allegheny River at Kiskimenitas, Pa., 3,000 to 4,000 tons; bids being taken.

Sturgis apartment house, Fifth avenue and Eighty-eighth street, New York City, 500 tons; bids being taken.

Loft building for W. R. Hearst, Columbus Circle, New York City, 1,000 tons, general contract awarded W. B. Shafer Co.

Various bridges for New York Central & Hudson River railroad, 800 tons, bids being taken.

Passenger station for New York, New Haven & Hartford railroad at Hartford, Conn., 500 tons, bids taken.

Billet Market is Strong

The Recent Advance is Being Well Maintained in All Centers

Ashland, Ky., Aug. 18.—A slight advance has taken place in billets and wire rods, the former being now held at $20.50, and the latter at $25.50, both Ashland basis. The market is still slow, but is better than last week.

Foreign Buyers Seek Billets

Philadelphia, Aug. 17.—Inquiries for billets for foreign shipment have been coming to eastern Pennsylvania mills in conspicuous number. A New York merchant, who is inquiry for 10,000 tons of rolling steel for export, as reported, is being quoted upon this lot by eastern mills. Other inquiries have concerned shipments to England, South America and Japan. In some cases no definite tonnage was fixed, and these incidents are regarded as overtures to what may develop into a considerable export market. Domestic buyers of billets in the east also continue more freely in the market and are closing some contracts. Rolling steel is about $22.40, Philadelphia, or $20, Pittsburgh, though one leading eastern maker is asking $1 higher and is holding forging billets at $27.40 to $28.40, Philadelphia.

Billet and Sheet Bar Prices Hold

Pittsburgh, Aug. 18.—Advanced prices for billets and sheet bars, announced 10 days ago, have been well established, and makers are not attempting to take further tonnages at prevailing figures, except for immediate shipment. Billets are firm at $20 and sheet bars at $21, maker's mill, but neither product is being offered at Pittsburgh. Increased specifications indicate corresponding increases in finishing mill operations.

Foreigners Want Cast Pipe

Difficult Problems Involved in Meeting Specifications—Domestic Demand Good

New York, Aug. 18.—Eastern cast iron pipe makers who now are devoting close attention to the opportunities for export to South America, believe that this traffic will be promoted materially when American standard specifications are adopted by the latter countries, as is now expected. Most of the South American municipalities and engineers have been following foreign pipe specifications after the metric system, particularly those from the British and French, and makers, as a result, have been enjoying considerable advantage in this trade. These specifications have provided lengths of 4 meters or about 13 feet against the United States specifications of 12 feet and have involved dissimilarities in other respects. For domestic makers to meet these foreign specifications entails expensive readjustments in practice and in plant arrangements and accordingly, they have not competed so vigorously for the South American trade in the past. The adoption of the American specifications, however, it is believed, materially will change this situation. An inquiry has been put out for about 5,000 tons of 28-inch pipe for water works construction at Santos, Brazil. In January, domestic makers competed for about 8,000 tons for part of the same work, but lost it to foreign shops. The Donaldson Iron Works is the low bidder at $20.73, on about 600 tons of 20's for Webster, Mass., and the Standard Cast Iron Pipe & Foundry Co. on 240 tons of 4's to 20's for Lowell, Mass., at $21.95, delivered. Riverhead, L. I., takes bids Aug. 25 on 970 tons of 4's to 14's. About 300 tons of 12-inch are up for Atlantic City. Prices have not improved in the eastern market and frequently touch very low points.

Cast Iron Pipe Slow.

Chicago, Aug. 18.—A number of municipal projects calling for cast iron pipe have been held up recently and are still undecided. Bids were opened recently at Toledo on 5,700 tons, some low quotations having been made, but the contract has not yet been awarded. At Delta, O., bids were rejected on an inquiry for 250 tons.

The American Cast Iron Pipe & Foundry Co. has been awarded 554 tons at St. Paul and 1,200 tons at Knoxville, Ia. An inquiry is out for 300 tons for a contractor's job at Estherville, Ia.

Westinghouse

Exports Not Seriously Affected By War

Interruption of shipments has interfered with the export business of the Westinghouse interests to a slight extent, but officers of the various companies believe more normal conditions will prevail shortly. Foreign business of the Westinghouse Electric & Mfg. Co., Pittsburgh, is comparatively small. Foreign Westinghouse companies operate plants in Italy, France, England and Canada. The chief exports of the American company are to South American points, Mexico, Cuba and Japan, and shipments to all of these countries have been affected.

The Westinghouse Air Brake Co. does a direct export business only with South American countries, export trade with European countries being relatively small. The company has factories and representatives in England, France, Germany and Russia, all of which enjoy a profitable trade.

The Westinghouse Machine Co.'s export shipments to European countries are light, but a large volume of business is enjoyed by this company in South American countries. The Union Switch & Signal Co. has no foreign trade. Some of its products are manufactured abroad under licenses from the American company.

The Ayer & Lord Tie Co., Chicago, is engaged in placing 9,400 square yards of creosoted block flooring in the plant of the Bingham Co., Cleveland.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

Houston Lowe Gaddis is now with the Ferro Machine & Foundry Co., Cleveland, making a special investigation of its factory and a study of its insurance problems, workmen's compensation, mutual benefit association, factory ventilation, health of workers and other social service problems. Mr. Gaddis is a graduate of Williams College. During the Ohio floods last year he worked with Dr. Edward Devine, special representative of the American Red Cross in charge of the relief work at Dayton. He was made a member of the American Red Cross Society at the close of the work in Dayton. He is a member of the Social Service Club, of Chicago, and during his work in that city was a member of Hull House. He made a special study of Chicago factories in connection with the prevention of tuberculosis. While at Hull House he conducted a series of health lectures on industrial diseases, which he illustrated with stereopticon views made from his own photographs.

HOUSTON LOWE GADDIS
Who is Making an Investigation of Social Service Problems

A. C. Dinkey, president of the Carnegie Steel Co., Pittsburgh, with other officials, inspected mills in the Youngstown district last week.

L. Z. Firth, son of Thomas Firth, of Thomas Firth & Sons, Sheffield, Eng., was in Pittsburgh last week, inspecting the Firth-Sterling Steel Co.'s plant at Demmler station.

L. Vogelstein, of L. Vogelstein & Co., 42 Broadway, New York, whose European trip was interrupted by the war, is returning to this country by way of Montreal. It is reported he sailed from Liverpool on the Royal George.

John A. Schwab, father of Charles M. Schwab, president of the Bethlehem Steel Co., South Bethlehem, Pa., one of the many Americans temporarily stranded in Europe, has arrived at the summer home of the latter at Loretto, Pa.

A. H. Ackerman, vice president and general manager of the United States Light & Heating Co., Niagara Falls, N. Y., prior to the receivership, has been appointed general manager, and the entire force of salesmen, engineers, etc., have been retained in their former capacities.

F. F. Prentiss, vice president of the Cleveland Twist Drill Co., has cabled from Naples to Senator Burton, requesting him to urge the government to send a vessel to the assistance of Americans stranded in Naples. Senator Burton has submitted the request to Secretary Bryan.

S. M. Marshall, formerly chief engineer of the Cambria Steel Co., Johnstown, Pa., has tendered his resignation as assistant general manager of A. J. Haws & Sons, refractory manufacturers, Johnstown, effective Aug. 31. Mr. Marshall's present address is 408 Tioga street, Johnstown.

George F. Taylor, sales manager of the Corbin Cabinet Lock Co., New York City, who was in Switzerland at the outbreak of the war, is, according to cable advices, trying to work his way through France, in the hope of reaching one of the northern French ports, where he is counting on getting a steamer to England, whence he will return to this country.

Arnold Pfau, a consulting engineer associated with Allis-Chalmers Mfg. Co., Milwaukee, has advised the company that he is held in Lucerne, Switzerland, for army service. Mr. Pfau holds only his first citizenship papers in America. Louis Kuehn, president of the Milwaukee Corrugating Co., is at Bayreuth and Strassburg, visiting his native home, but no word has been received from him. The Schlesinger family, of Milwaukee, is making every effort to secure the return to Milwaukee of Mrs. Oskar Roller, wife of Lieut. Roller, of the Fifth Hussars, Austro-Hungary. Mrs. Roller is a daughter of Ferdinand Schlesinger.

Fred A. Poor, president of the Vermillion Malleable Iron Co., with plant at Hoopeston, Ill., and offices of the president at the Railway Exchange, Chicago, is a newly elected member of the American Iron and Steel Institute. Mr. Poor was born in Andover, Me., in 1870, was graduated from the high schools at Port Chester, N. Y., in 1887 and went in 1892 to Chicago, where he entered the employ of the Hall Signal Co. A year later he became signal maintainer for the Illinois Central, and in 1897 was made supervisor of electric signals throughout the Illinois Central system. In 1900 he went to the Weber Railway Joint Mfg. Co. as assistant engineer and soon was made western representative. In 1906, when the Weber company was merged into the Railjoint Co., Mr. Poor went to Europe to organize a foreign department. He remained there two years as manager of that department, with headquarters in London. In 1909, he

FRED A. POOR
New Member American Iron and Steel Institute

MEN OF THE IRON TRADE

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returned to America and was made sales agent of the Railjoint Co. in Chicago. This place he resigned June 1, 1914, to become president of the P. & M. Co. He was elected president of the Vermillion Malleable Iron Co. in January, 1913.

Louis J. Affelder, assistant division contracting manager for the American Bridge Co., with headquarters at Pittsburgh, recently has been elected a member of the American Iron and Steel Institute. He has been connected with the iron and steel trade since

LOUIS J. AFFELDER
New Member American Iron and Steel Institute

1894, when he was graduated from the University of Pittsburgh, upon the completion of a course in civil engineering. Mr. Affelder's first position was with the Pittsburgh Bridge Co., where he gained his early experience in structural engineering as a draftsman and as a member of the estimating department. He was principal assistant engineer for that interest when the organization of the American Bridge Co. was affected, and became contracting engineer at Pittsburgh for that company. Later he was appointed contracting manager and subsequently became assistant division contracting manager. For a number of years Mr. Affelder has also had charge of the steel barge department of the American Bridge Co., which has developed rapidly within recent years.

Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Mfg. Co., Pittsburgh, has returned from Europe on the Celtic.

Theodore Hofeller, president of Theodore Hofeller & Co., Buffalo, formerly president of the National Association of Waste Material Dealers, who went abroad in June with his wife, is at Luzerne, Switzerland, awaiting an opportunity to return to this country.

Secretary of State Bryan has been asked to endeavor to locate Mr. and Mrs. Albert W. Hitz, of Cleveland. Mr. Hitz is superintendent of the Newburg wire plant of the American Steel & Wire Co., Cleveland. With Mrs. Hitz and several friends, he sailed on the Vaterland, a Hamburg-American line steamer, for Hamburg, July 17. The last word from them was a letter sent from Berlin, July 24, stating that they were delayed there.

Richard T. Crane III has resigned as second vice president of the Crane Co., Chicago. This action follows the resignation of his father, Charles R. Crane, who vacated the presidency of the company a week ago. R. T. Crane III will not be actively connected with the company except through retention of his directorship. Election of officers of the Crane Co. has resulted as follows: President, Richard T. Crane Jr.; first vice president, J. B. Berryman; second vice president and treasurer, A. D. MacGill; secretary, E. H. Raymond; assistant secretary, R. B. Stiles. Directors include the officers and W. W. Doolittle, H. P. Crane, Richard T. Crane III, J. R. Wrath, C. A. G. Wayman and A. F. Bennett.

G. A. Reinhardt, a newly elected member of the American Iron and Steel Institute, is metallurgist of the Youngstown Sheet & Tube Co. His early education was obtained in the Cleveland public schools. He graduated from Case School of Applied Science, of Cleveland, receiving the degree of Bachelor of Science in Chemistry in 1905. He also received the degree of Met. E. in the mining school of Harvard University in 1913. Mr. Reinhardt has been employed by the following companies: Dominion Iron & Steel Co., Sydney, N. S., chemist; Carnegie Steel Co., Youngstown, chemist; Salem Iron Co., Leetonia, O., chief chemist; Cleveland Furnace Co., Cleveland, chief chemist; Crowell & Murray, Cleveland, chief chemist; Lake Superior Iron & Chemical Co., Ashland, Wis., metallographist. The year 1911 to 1912 was spent by Mr. Reinhardt in metallurgical research in Harvard University and in the following year, 1913, he served as assistant to Prof. Albert Sauveur, of that university. Since leaving Harvard in 1913, he has been

G. A. REINHARDT
New Member American Iron and Steel Institute

engaged as metallurgist of the Youngstown Sheet & Tube Co., Youngstown.

Put on Night Crews.—Since the blowing in of the new furnaces at Woodward, Ala., by the Woodward Iron Co. night crews have been placed at work in the mines operated by that company, as it was found the regular day shifts could not turn out enough ore to keep the furnaces going. The United States Cast Iron Pipe & Foundry Co. has put on a night shift at its Birmingham plant to handle the rush of orders received recently. This company received a large part of the government order for the Panama canal zone.

Foreign Demand

For Steel Products—Heavy Rail Tonnage Transfer

New York, Aug. 19. (By wire.)—There is a well-defined report in the market that German makers have transferred to American mills 30,000 to 50,000 tons of rails for Argentine which they are unable to deliver. Leading exporters are receiving numerous inquiries for all classes of steel products from various parts of the world, but little business has yet resulted. Japan, in addition to 1,000 tons of pierced billets, is now inquiring for 1,800 to 2,000 tons of tube rounds. Recent inquiry from this district for 10,000 tons of billets, previously reported, is for Scotland.

B. & O. Buys Rails

But Otherwise the Railroads Are Limiting Their Purchases

New York, Aug. 18.—Some of the railroads in eastern territory have been specifying liberally against contracts, notably in steel bars, but buying of rails, equipment and other iron and steel supplies by the steam lines generally, is on a very low scale. In cars, excepting possibly the inquiry for 4,600 for the Southern Pacific, which there is good ground now for believing may not materialize for some time, though it remains before builders, no negotiations of any importance are under way. In fact, the car market is practically bare of activity and it is promised that this situation may continue until the equilibrium in the financial world is restored.

In rails, the Baltimore & Ohio has closed for 9,000 tons, which have been distributed among the Carnegie Steel Co., Cambria Steel Co. and Tennessee Coal, Iron & Railroad Co. This road has 9,000 tons of its recent inquiry yet to place. Some time ago, it placed 6,000 tons with the Maryland Steel Co. Some other domestic rail inquiry continues before the mills and some export negotiations, depending upon the ability to obtain transportation, also are going forward. The market, however, is affording makers very little encouragement at present. The Maryland Steel Co. steel works and rail mill at Sparrow's Point have been shut down indefinitely.

Small Sales of Rails

Cleveland, Aug. 18.—The Clover Leaf railroad has placed an order for 500 tons of standard rails with the Lackawanna Steel Co. and a like tonnage of rails with the Carnegie Steel Co., this being in addition to some smaller purchases made previously. The Nickel Plate railroad has filed plans with the city authorities involving various yard improvements in this city, estimated to cost in the aggregate $400,000, of which $100,000 will be expended upon a freight house. Tracks will be relocated and additional yardage constructed, but the probable rail requirements have not been announced.

Coke Declines

Both Furnace and Foundry Grades Easier

Pittsburgh, Aug. 18.—The Connellsville coke market, like that for pig iron, refuses to be excited by European war talk. Demand is light and prices are weak. Blast furnace coke is obtainable at $1.75, ovens, for spot shipment, and some tonnage is being sold at that price for delivery the next four or five weeks. Foundry grades are inactive and prices are irregular, some contract tonnage having gone at $2.30, ovens, or 20 cents a ton under the general asking price. The *Connellsville Courier* for the week ending Aug. 8 places production in the upper and lower regions at 264,070 tons, a decrease of 5,505 tons compared with the previous week.

Sales Confined to Foundry Coke

Cleveland, Aug. 18.—A few transactions in Connellsville foundry coke for prompt delivery are reported, but in almost every case the tonnages involved are small, usually one or two carloads for prompt delivery. Some sellers are getting $2.50, ovens, for strictly standard Connellsville grades, but users are able to buy small tonnages at a shade under this figure. There is little buying of furnace coke, and its price for prompt shipment continues around $1.75, ovens.

Better Business in Sight

Cincinnati, Aug. 18.—Demand for coke is scattered and is limited to small tonnages. Operators are looking forward to better business this fall, because the scant requirements that numerous foundries and furnaces have on hand now will not run them more than a few months. Prices on southern coke are a little stronger, but do not show any tendency to advance.

Scrap Offerings at St. Louis

St. Louis, Aug. 17.—Scrap iron offerings in the St. Louis market, closing this week, are: Union Pacific, 2,500 tons; M. K. & T., 950 tons; M. K. & St. L., 4 cars; N. O. & N. E., 45 tons; C., St. P., Minneapolis & Omaha, 1,175 tons. Dealers are declining to sell scrap as a rule, and the market is dull.

METAL MARKETS

New York

Aug. 18.

Copper.—The waiting situation in copper continues. Both buyers and sellers are forming their ideas deliberately regarding a future which is so problematical. What sales are being made are along restricted lines and are not heavy, relatively speaking, so that traders still regard prices as untested and to some extents nominal. As far as is indicated by known transactions, electrolytic is quotable from 12.37½c to 12.50c, 30 days and on a cash basis, 12.20c to 12.25c, New York.

Some activity is shown in the lake copper market, though buying here is largely of the hand to mouth variety. Ordinary brands of prime lake have been selling at 12.62½c to 12.75c, cash New York, while the selected brands are around 13c.

Tin.—Owing to larger arrivals than expected, the tin market in the week receded sharply through its recent high levels and yesterday sales were made at 41c and 42c New York, with reports of 39c having been done. This little flurry having passed and the demand continuing good, the decline is being recovered and 48c and 49c was paid today.

Lead.—The market is steady at 3.90c, New York, for carload lots, equivalent to about 3.70c, St. Louis, but there is scarcely enough demand to give it firmness.

Spelter.—Domestic users of spelter are buying quite freely for shipment during the next 90 days, as their stocks are low. This business is being put through at present at 5.75c, St. Louis, or 5.90c, New York. There has been considerable selling of domestic spelter for export, particularly to England, where the imports greatly have been interferred with by the war. It is said that 6c New York was paid by foreign buyers upon this business.

Antimony. — Despite the extremely high prices, there usually is a buyer for all offerings of antimony as many of them are in pressing need. Some sellers have moved considerable quantities during the past week. Cookson's is very scarce and prices range from 20c to 25c, duty paid New York, according to the particular seller or buyer. Chinese is quoted at 15c to 16c, duty paid, and United States at 20c.

Aluminum.—With foreign aluminum shut off for forward deliveries, the domestic producers continue to dominate this market and has been covering consumers for their requirements during the next year. This selling has been good, but not extraordinary. Some of the largest buyers have yet to cover, but they are expected to come in soon. The prices at which these contracts have been taken have been from 20 to 21 cents; Niagara Falls, on No. 1 ingots, depending upon the particular transaction. Some lots of spot foreign aluminum are being marketed at 21 to 22 cents New York, duty paid. There has been no clearing up of the foreign situation and sellers are unable to determine when shipments will be resumed. Germany, obviously, is out of the situation entirely and in France and England, the transportation feature still makes the outlook very uncertain. Exports from England are more in doubt for the reason that that country draws its bauxite from France and it is not known how producers there are fixed with regard to their raw material.

The wire plant of the John W. Roebling's Sons Co., at Trenton, N. J., and the open-hearth steel plant at Roebling, N. J., have been closed temporarily. The shut-down is said to be due to the shutting off of the export business of the company.

THE ABC OF IRON AND STEEL

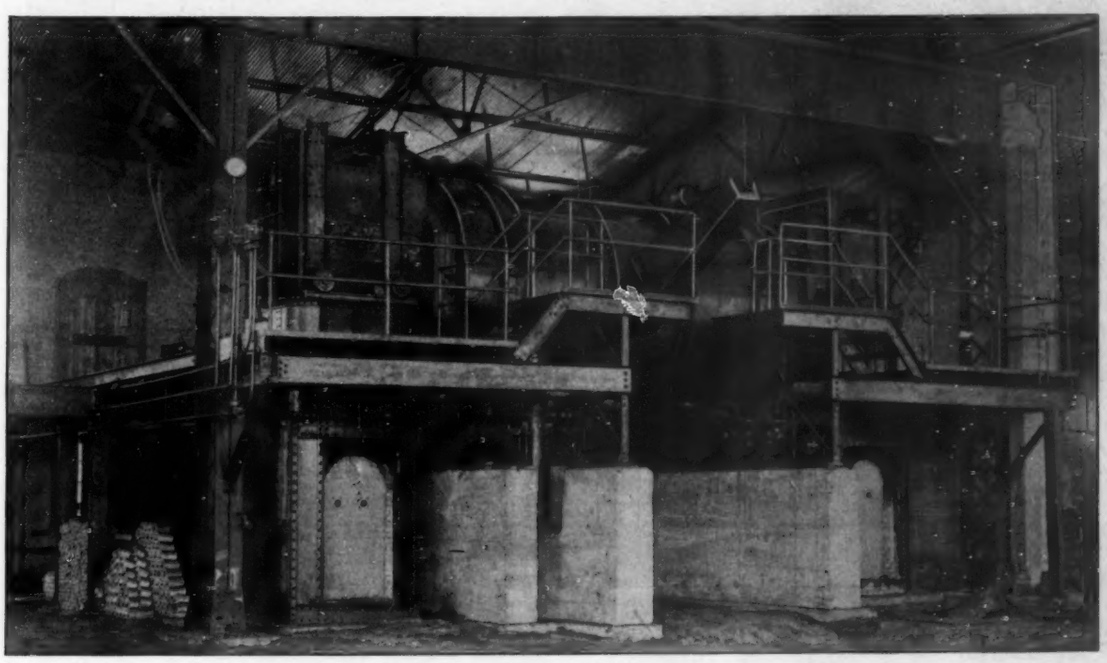
Making Steel Castings--II

The Open Hearth and the Electric Furnace

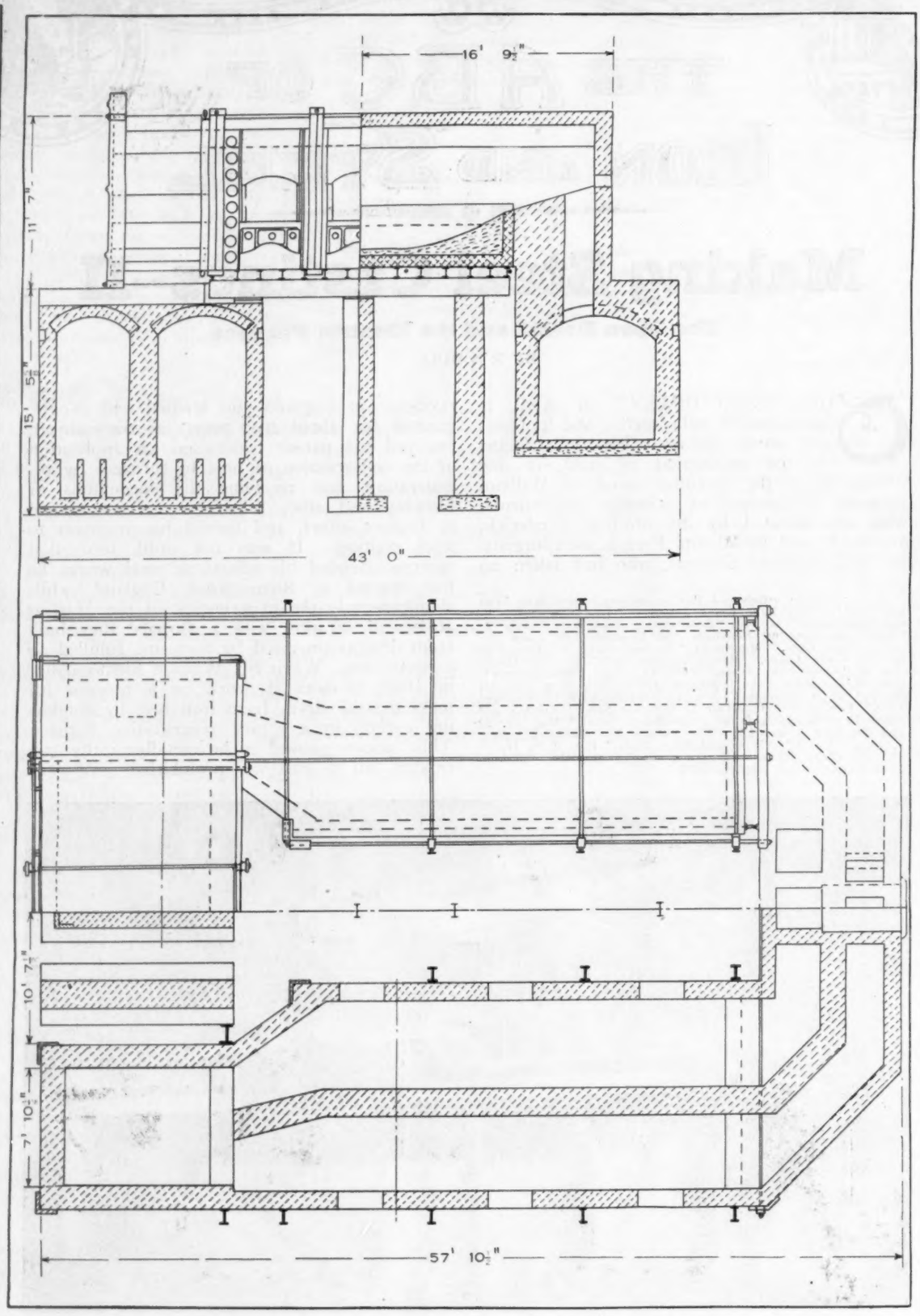
BY R A BULL

THE DEVELOPMENT of what is now both in mill-practice and in foundry work the most important factor in the production of steel, is due principally to the inventive mind of William Siemens, a German of scientific antecedents, who was assisted by his brother, Frederick, and by P. and E. Martin, French metallurgists. In 1861, William Siemens, who had taken up residence in England and studied and experimented for about five years on the subject, received his patent papers on an application of the conservation of heat to furnaces by regeneration, and receiving the encomiums of Faraday and other scientists was encouraged to further effort, and turned his attention to steel melting. It was not until 1867 that success attended his efforts at steel works he had erected at Birmingham, England, while simultaneously the experiments of the Martins at Sireuil, France, with a furnace they built from designs provided by Siemens, fulfilled all expectations. When Sir William Siemens died in 1883, he was at work on a process for making steel direct from iron ore, by employing carbon in a rotary regenerative furnace. This process proved to be metallurgically successful, but its cost was prohibitive.

The following articles of this series previously have been published in THE IRON TRADE REVIEW: "Iron Ore and Mining Operations," Jan. 5; "Beneficiating Iron Ores," Feb. 2; "Rules for Figuring Penalties and Premiums on Lake Superior Iron Ores," March 9; "Transportation of Iron Ore on the Great Lakes," March 16 and April 13; "Ore-Handling at Lower Lake Ports," Oct. 12, 1911; "The Manufacture of Bee-Hive Coke," Jan. 4, 1912; "Pig Iron and Its Method of Manufacture," Jan. 2; "Manufacture of Wrought Iron," Feb. 6; "Manufacture of Crucible Steel," April 3 and April 10; "Manufacture of Open-Hearth Steel," May 15, 22 and 29, June 5 and 12; "The Rolling Mill Industry," Aug. 7, 14, 21 and 28; "Wire and Wire Rods," Oct. 2, 9, 16, 23 and 30, 1913; "Making Bessemer Steel," May 21; "Making Steel Castings—I," Aug. 6, 1914.



TILTING OPEN HEARTH FURNACE IN A STEEL FOUNDRY

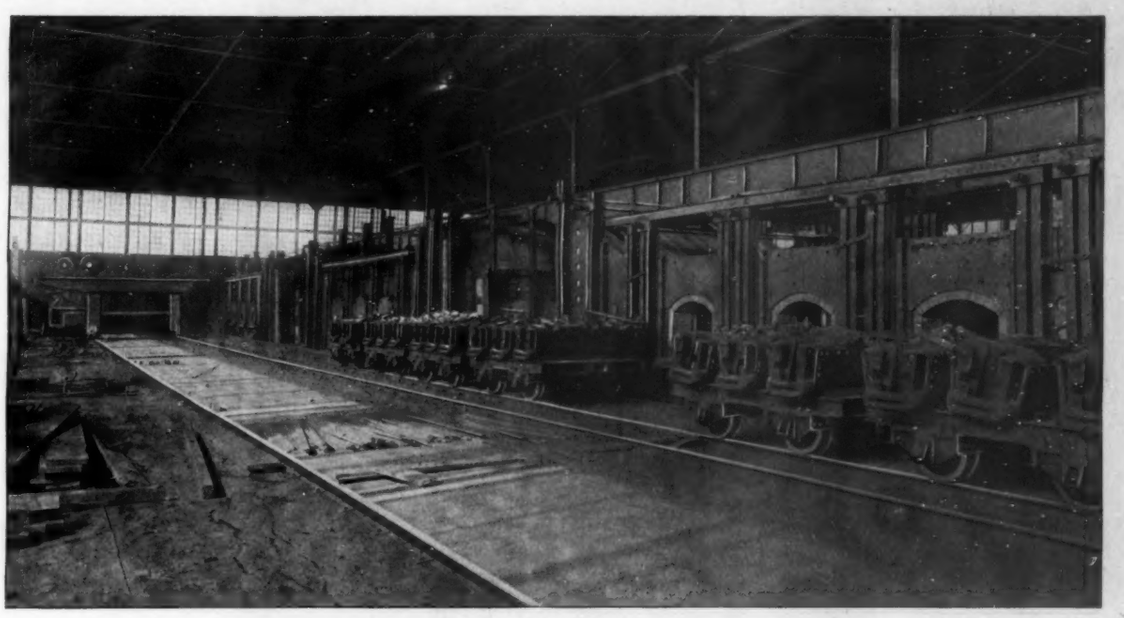


PLANS, SECTIONS AND ELEVATION OF OPEN HEARTH FURNACE FOR STEEL FOUNDRY

The acceptance of the open-hearth or Siemens-Martin furnace, as it was soon called, was immediate, as it was believed that the process would materially reduce the cost of steel-making, and as it was perceived that the new type of furnace lent itself admirably to basic reduction. Its advancement has been continuous, and today in the mill and in the foundry the open-hearth furnace is by long odds the leader in steel-making, because it combines economy of production with first-class quality.

The bath, which is termed an open-hearth because the fuel is applied directly to it, is a shallow rectangular basin, the width being restricted to about 15 feet by the facility with which a furnace-helper must be enabled to perform his duties. The front-wall is usually provided with three charging doors, and the back-wall with a single outlet, centrally located between ports or ends. The roof proper is sometimes arched both from port to port and from front-wall to back-wall, though generally only in the latter manner. Roof, sides and ends are built of silica bricks to withstand the excessive temperature, which in foundries pouring very hot steel reaches 3,100 degrees Fahr. Mill furnaces pouring ingots need not deliver such fluid metal. The walls are secured by rolled or cast buck-stays and tie-rods are generously supplied for additional stability. The rods crossing the roof must with care be lengthened and shortened as the furnace expands and contracts. The fuel, which is generally natural gas, fuel oil, or producer gas (mentioned in the preferred order of adaptability) enters the melting chamber or hearth at each port alternately, as does the pre-heated air for combustion. The flame traverses the length of the bath, playing over the surface of the charge, and the spent gases enter the opposite port, passing downward to the chamber leading eventually through a valve to the stack. This chamber, duplicated at each side in the same fashion as the ports, has rows of brick work (generally of fire clay except near the slag-pockets, where silica brick are frequently employed) placed in such manner as to be appropriately termed "checkers", the object being to provide a large amount of radiating surface to the hot gases, and maintain a high temperature in the chamber after the passage of the gases has ceased.

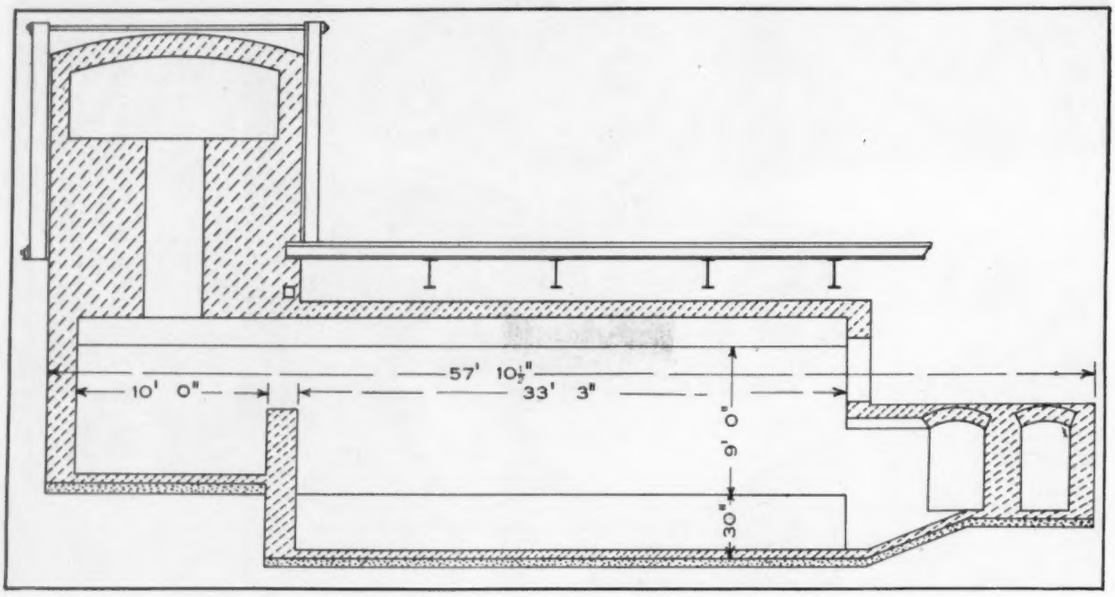
After the flame has played over the bath for from 20 to 30 minutes, the valves connecting the checker-chambers with the stack-flue are reversed, as are the valves controlling the fuel and air, and in the case of a gas-fired furnace, both gas and air are led to the uptake by way of the checkers, through which the spent gases have just been passing, and which therefore serve their regenerative function by pre-heating before combustion, and making the latter much more effective. In the oil-fired furnace the fuel is delivered direct to the atomizer, which may employ compressed air or steam, and only the air is pre-heated in the checkers. It will, from the above, be seen why this type of furnace is called a regenerative open-hearth, and it may be readily understood that much of the furnace construction has naught to do with the melting chamber.



TYPICAL OPEN HEARTH CHARGING FLOOR IN A LARGE STEEL FOUNDRY

The open-hearth furnace, of course, suffers from the heat most in the chamber where combustion takes place, and this portion is so constructed that Sunday repairs may be made periodically without taking the furnace out of commission. Charging doors are brick-lined

and can be replaced with freshly-lined ones, always in readiness. Door frames are sectional, permitting replacement of burnt-out parts. The roof is supported primarily by the metal framework, and therefore remains in position while repairs, sometimes quite extensive, are made to front-wall and back-wall. The brick around the ports cuts away rather fast, and is so placed as to permit quick replacement. Repairs to roofs are sometimes made in restricted areas, and one type of roof having wedge-shaped projections at intervals has been patented, which contemplates the application of a secondary roof before the original becomes dangerously thin. A roof which originally may have been 9 inches or 12 inches thick from wall to wall, or which may have tapered from 12-inch thickness at back-wall, where the heat is greatest because of absence of charging doors, to 9-inch thickness at front-wall, sometimes retains its position when burned away to 2-inch thickness, and after glowing red on the upper side for several weeks.



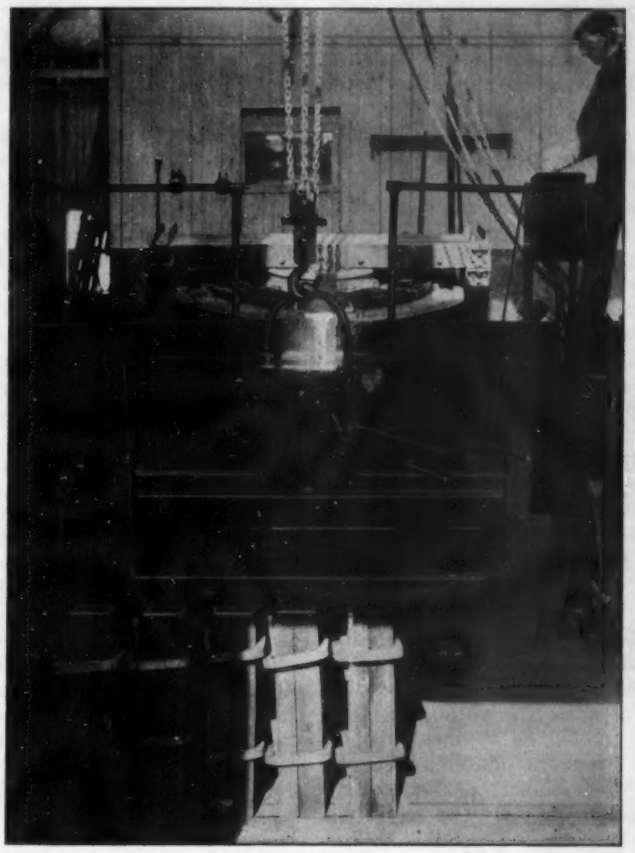
SECTION OF OPEN HEARTH FURNACE THROUGH PORTS AND REGENERATOR

The pan or hearth is supported by steel plates, on which several courses of refractory brick are laid. In the acid furnace, these brick are of clay or silica, and underlie a working bottom of silica sand from 12 inches to 20 inches in thickness, originally applied in successive shallow layers, which are given opportunity to fuse under the action of the flame. The basic bottom has magnesia brick, resting on clay brick, and on top of the former the working bottom of magnesite (calcined carbonate of magnesium, mined in Europe) is applied in the same way as the sand bottom was built up, but generally being mixed with about 10 per cent pulverized basic slag to assist in quick setting. There being much more slag in the bath of a basic furnace than in acid melting, the bottom of the former must be sloped higher on the walls to prevent the basic slag from attacking the acid (silica) brick in the sides. Between the magnesia brick of the gradually rising bottom and the silica brick of the walls and bulkheads, as the ends are called, brick made of chrome, which is neutral, are customarily interposed.

The basic furnace must have a chamber at each end which corresponds to a soot pocket at the elbow of a soft-coal domestic stove, and which by gravity catches the bulk of that portion of the slag which is carried by the flame in a fine spray entirely across the bath and down the vertical chambers. Where these join the horizontal passages the slag pockets are built in, having arched door-ways bricked in on one side for transfer sometimes effected with the slag in a melted condition, or removal after the furnace has been taken out of service for over-hauling.

The open-hearth furnace must be operated continuously and when not melting steel is kept hot, pending charging time. It is not possible to prolong week-end repairs, during which the fuel is turned off, without damage to the brick-work by contraction and subsequent expansion, and without delaying the melting of the next charge through slow reheating. Where producer gas is used, Sundays are utilized to clean out the gas-flues which collect much soot, retarding the passage of the fuel. The only economical way to operate an open-hearth furnace is to charge a heat immediately after tapping a melted one,

allowing only sufficient time to patch the bottom, which ordinarily consumes not more than 20 minutes. A furnace bottom lasts several years if properly cared for and in basic practice is repaired after tapping with dolomite or magnesite bonded with tar. An acid bottom is patched with sand. The average basic furnace in the steel foundry requires about eight and one-half hours to make a heat, and the acid furnace will melt a heat in five to six hours, though these periods in any case are governed largely by many local fixed conditions, such as the liberal or scant proportions of the checkers or stack, the depth of the bath, the design of the ports and burners, and other factors; and by variable conditions such as the composition of the charge, the condition of the furnace as to repairs, quality of fuel, etc. The life of a basic furnace in the steel foundry, or the period between general repairs when it is cold, does not average more than 350 heats, while the acid furnace may make 1,000. Many expedients have been tried to prolong furnace life. Ports and door-frames have been water-jacketed, novel roofs have been devised, as previously cited, removable slag-buggies have been invented, and checkers have been most liberally designed to permit comparatively free passage even after the restricted spaces due to their dirty condition obtain. It is not surprising that inventive furnacemen have given much thought to these details, for the direct cost of extensive repairs to a furnace of 15 tons capacity, the average size of a foundry unit (which varies from 8 to 35 tons) will not fall far short of $1,500, at the prevailing cost of labor and material.



POURING ELECTRIC STEEL

In acid melting in the foundry, the metal ordinarily consisting of from 35 to 50 per cent pig iron, steep scrap constituting the remainder, is charged cold, and in the larger foundries the material is introduced by an electrically operated charging machine, in boxes the end pockets of which engage the head of a ram which moves horizontally, on its axis, and is shifted vertically at its terminus. There is very little slag, which forms principally from the silicon-dioxide of the sand bottom and from ferric-oxide of the iron ore used in small quantities to hasten the oxidation of carbon. Manganese and silicon are also oxidized and this reaction raises the temperature. The phosphorus and sulphur are not reduced, consequently pig and scrap containing small percentages of these enemies to the steel-maker must be used. Generally the carbon is oxidized to several points below that desired in the final analysis, then checked by the additional carbon contained in ferro-manganese and ferro-silicon used to supply desired percentages, and raised by anthracite coal in judicious proportions thrown in the ladle. The drop in the carbon-content of the bath is not always regular, and the melter has a better opportunity of finishing within the narrow limits usually prescribed if he waits for a known quantity, then holds it constant (as nearly as may be) and finally increases it by a carefully gaged addition. In basic steel foundry practice, the same proportions of pig and scrap are customarily charged, as are used in acid practice. But in some basic and acid furnaces the percentage of pig iron is appreciably lessened by charging with the scrap "carbo", a commercial name given petroleum-coke, a by-product obtained from oil refineries, containing about 92 per cent carbon. This material supplies the necessary carbon commonly yielded from pig iron and present only in limited quantities in the scrap.

There is also charged in basic melting from 12 to 16 per cent lime-rock, very low in silica, and analyzing about 94 to 98 per cent calcium carbonate. This makes a heavy burden of very basic slag, which attacks the phosphorus vigorously and, like manganese, has some effect upon the sulphur. Iron ore is used

as in acid practice, to facilitate carbon oxidation. Frequently if pig containing 0.15 per cent and scrap averaging 0.05 per cent phosphorus are used, by the time all the metal is melted, the phosphorus-content, by preliminary analysis (of which from two to six may be made for carbon) will not exceed 0.005 per cent, in which event no further phosphorus preliminaries are demanded of the laboratory. Additions made later increase the percentage of phosphorus. Generally no determinations are made prior to tapping, save for phosphorus and carbon. These are necessarily made by extremely rapid methods requiring a few minutes, but are quite accurate enough for the purpose. The carbon determinations are only supposed to verify the reading of test-fractures by the melter, who acquires much skill in this operation. Carefully weighed quantities of ferro-manganese, ferro-silicon, some aluminum and anthracite coal are added in the ladle, and sometimes ferro-manganese, and nearly always ferro-silicon are also added to the bath a few minutes before tapping. The ferro-alloys, containing manganese (to the extent of about 80 per cent) and silicon (to the approximate amount of 12, 50 or 90 per cent, according to the grade of the material) are introduced not only to give the desired percentages of these elements to the product, but to serve the same purpose as that for which aluminum and some patented alloys, such as those containing titanium and vanadium are used, viz.: to act as deoxidizers, necessary to quiet the steel which is contaminated by oxides and is too "lively" to make homogeneous castings without assistance of materials having a decided affinity for the self-assertive oxygen which has now overstayed its welcome. Some of these alloys have other properties.

There are two types of open-hearth furnace which present interesting modifications from the standard stationary type that has been described. One of these is the rolling or tilting furnace devised by S. T. Wellman about 1898. The tilting furnace has sometimes been rolled by hydraulic power, and sometimes by an electric motor. To say that a heat from such a furnace is tapped is to incorrectly describe the operation, technically speaking. When the heat is ready for pouring, the hydraulic valves or electric switches are manipulated and the melting chamber exclusive of its port ends is slowly turned, the spout swinging downward until the metal flows from it to the ladle. If desired, any portion of the slag may be drained off at any time, or the heat may be divided into several ladles. Should a bad boil occur on the bottom, causing parts of it to leave the pan and sometimes making it possible for the steel to melt bottom plates and break through, the furnace can at times be tilted to a safe angle while repairs are made. The chief difficulty with this type of furnace is a materially reduced life, due to brick displacement caused by its movement.

The other type of movable furnace is the invention of W. M. Carr, and was introduced in 1900. It combines furnace and ladle, and the metal is teemed from the bath to the mold without an intermediate operation. It is necessary that one crane runway span not only pouring floor, but furnace. When the steel is melted and refined, the central section of the furnace is lifted bodily from between ports, carried to foundry floor and teemed through a nozzle placed in the central lower portion, in which a stopper-rod was properly set before the heat was charged. This furnace is tapped no more than is the tilting furnace, as, literally speaking, tapping consists of partially digging out the tap-hole from the back and opening up the same finally by punching or tapping it through by a bar, from a charging door. Obviously Carr's furnace must be of small size and in any case calls for liberal crane capacity. Disadvantages of this novel type of furnace would seem to include the chilling of the furnace during the pouring interval when no fuel can be applied and high installation cost for the capacity. All types of furnaces have their characteristic disadvantages, and it does not detract from the ingenuity of a designer to point to certain deficiencies.

Since the price of fuel oil was considerably advanced a few years ago, persistent, intelligent effort has been directed toward the use of tar and powdered coal as open-hearth fuels in both mill and foundry. Little authentic data is available as to results achieved, but thus far it is believed that they are not entirely satisfactory, though progress has been made. It is reported that powdered coal (which should be high in volatile matter, low in ash and moisture and so well pulverized that the greater part passes a 200-mesh screen) makes a more intense flame than the customary fuels; that it chokes the checker openings very quickly, reducing the life of a furnace built on the usual plan; and that occasionally it seriously contaminates the bath with sulphur.

The open-hearth furnace is admirably fitted for the steel foundry making castings classed as *ordinary,* not because of quality, but as distinguished from those of very small size or special composition. The steady demand for ordinary steel castings enables continuous operation, essential to economical open-hearth practice. Siemens-Martin steel of poor, medium, good and excellent quality is produced, depending on nature of materials charged, bottom employed, and skill in operating. Because of the large number of open-hearth furnaces in use, good furnacemen are not difficult to secure. The process is the cheapest that has been developed for making steel castings, despite the fact that maintenance expense is heavy. Installation cost is only exceeded by that required for an electric furnace and varies with the necessity for auxiliary gas producers. Roughly speaking, the furnace alone will cost, at the present rates for labor and material, $1,000

per ton of capacity, if of normal size for the foundry, where the longer time consumed in pouring necessitates smaller units than those found in mills.

The electric furnace designed for steel melting is nothing more than a recent development of ideas conceived by Wall, Pichon, Siemens, de Laval, Ferranti, Colby and Taussig—scientists who during a period of 50 years experimented to the end that heat generated electrically might be utilized in iron and steel works. Doubtless some of these geniuses would have anticipated Stassano, Heroult, Kjellin, Girod, Rodenhauser and others in their commercially successful efforts since 1898, but for the handicap of excessive power cost of earlier times. With the beginning of the present century, certain hydro-electric plants were operating in France, Italy and Sweden, where very cheap power was available, and this explains the priority of European electric furnace installations in steel works. Foreign successes followed each other and stimulated experiments by American designers, but it must be admitted that to date these have met with indifferent success, though involving the expenditure of large sums.

The United States Bureau of Mines reports only 14 electric steel furnaces installed in this country at the beginning of 1914, out of which perhaps 2,000 tons of castings are annually produced. In Europe, where there are at present writing 130 electric furnaces, the process is becoming an important one in the realm of the steel foundry, due to the same condition which fostered early development abroad. The utilization of water power, latterly commanding much attention in this country, may make many things possible, including a sufficiently reduced cost for kilowatt-hours to attract the steel founder. Because of this and the fact that the electric furnace is one of the most interesting as well as the most modern unit devised for making steel, we should honor it with a brief description.

The electric furnace always generates heat from alternating current, principally to prevent deteriorating effect of electrolytic action on the metal. If the direction of the current were constant, separation of certain elements and new combinations of them would result. With the current continually alternating its direction, dissociation is momentary and instantly reversed, so that for practical purposes there may be said to be no chemical changes which are not desired, if we except those sometimes occasioned by the absorption of carbon. The furnace may be of the arc or induction type, and in general demands current without appreciable fluctuations.

The electric furnace is generally of the tilting design, though the rotating furnace is in use. It is always designed to receive hot metal, but some cold stock is charged in a number of plants. The temperature is reported as reaching the very high figure of 4,700 degrees Fahr., and necessitates very frequent repairs to brick-work. Roofs are removable for facility in charging and quick replacement when burned out. Units operating vary in capacity from one to fifteen tons, those of the latter size being rarely built.

The arc type of furnace may have its electrodes vertically penetrating bottom and roof, or beside each other in a vertical position over the bath, or directed horizontally from each end of the furnace towards the bath. A layer of slag, which should not be thin enough to reflect as a mirror the heat to the roof, protects the metal against regularly absorbing carbon from the super-imposed electrode. The electrode may be of graphite or carbon, and for a furnace of any size, is of awkwardly large diameter for cheap manufacture. Consequently clusters of several smaller electrodes are sometimes employed. The electrodes reduce in size rapidly by oxidation under the temperature of the arc and their renewal-cost is quite an important item in maintenance expense, as may be judged from the statement that electrodes 6 feet long and 20 inches in diameter are used in 15-ton furnaces. In certain furnaces, the electrodes are adjusted automatically as the ends, always pointed, burn away. Some success has attended efforts to prolong their life by water-cooling them.

The induction furnace is equipped with coils to transform the energy to heat. These are arranged in various ways whose relative advantages are not readily apparent to the layman. Metal must be in circuit on the hearth before heat can be induced, and during Sunday shut-downs the furnace is partially or completely charged and heated up to form a perfect metallic circuit for quick melting. Then the current is turned off till time for beginning the week's operations. When using cold stock, the furnace cannot be entirely emptied. A liberal amount of metal in one mass must be present to maintain the circuit or the furnace will lose its fuel. This type of furnace has had the attention of fewer designers than has the arc type, and has not been so readily adopted as the latter.

One significant feature of electric furnace refining consists (through the agency of basic slag) in the practical elimination of sulphur, made possible by the very high temperature. In basic open-hearth practice, steel made from the best obtainable stock very rarely analyzes as low as 0.015 per cent in sulphur, while some electric steel is reported as containing 0.006 per cent. Not only does oxidation, or the combination of substances with oxygen occur in the electric as in the open-hearth furnace, but reduction or deoxidation takes place, and this action, if properly governed, should practically remove from electric steel the harmful oxides present in greater or less degree in open-hearth and converter steels. As combustion does not depend on the presence of at-

(*Continued on page 358b*)

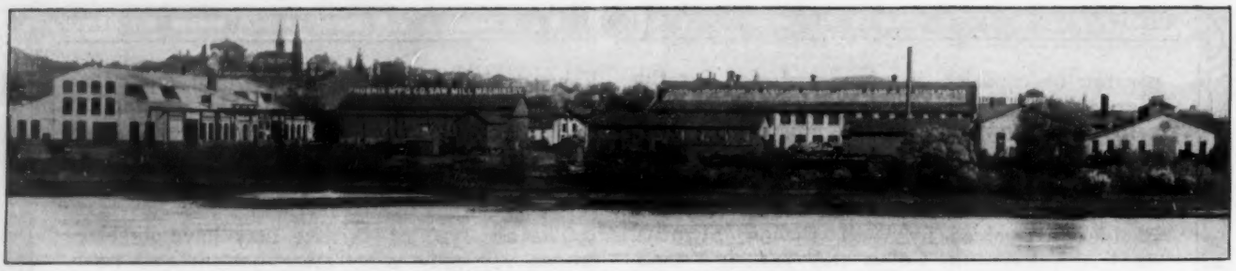


Fig. 1—Plant of Phoenix Mfg. Co. on the Eau Claire River

Foundry for Miscellaneous Work

Plant of Phoenix Mfg. Co., Eau Claire, Wis., Equipped to Turn Out Gray Iron or Semi-Steel Castings

THE FOUNDRY of the Phoenix Mfg. Co., Eau Claire, Wis., is equipped to handle an interesting variety of work. Primarily it is designed to turn out heavy gray iron and semi-steel castings for saw mill and logging machinery, but at the same time a large amount of miscellaneous jobbing work and many high grade machine tool castings are handled. On account of the variety of the output and the general nature of the equipment, this shop presents a number of interesting features. The foundry is operated in connection with a large manufacturing plant which includes a machine shop, forge shop, pattern shop, carpenter shop, warehouse, etc.

The various buildings are grouped on the east bank of the Eau Claire river. The property of the company embraces 5½ acres, 2¾ acres of which are under roof. The Phoenix Mfg. Co., is one of the largest as well as one of the oldest metal working and machinery manufacturing concerns in northwestern Wisconsin. The business was organized in 1861 for the purpose of building and repairing saw mill machinery and taking care of such miscellaneous jobbing work as could be obtained. The plant has been located on its present site for 40 years, since 1874, but in recent years has been entirely re-constructed and modernized. At the present time, the company builds a large amount of saw mill machinery, including band saws and also constructs locomotives for hauling logs over the snow, gasoline tractors, machine tools, etc. The machine tool end of the business which now forms an important part of the total output, was developed incidentally through the efforts of the management to improve the efficiency of the work in its own shop.

Brick and Steel Foundry Building

The new foundry building is a brick and steel structure 200 feet long and 100 feet wide with a flask and pig iron storage yard alongside served by an electric gantry crane with a span of 45 feet. The building has a very large monitor, surmounting the entire main bay which is 40 feet in width. Each of the two side bays is 30 feet wide. One is utilized for molding and the other contains the melting, cleaning, core making and other auxiliary departments.

The building is absolutely fireproof, the roof being concrete lagged on the inside with 1 x 10-inch planks. The charging floor is concrete and steel and adjacent to it is a mezzanine floor, which forms the ceiling of the blower room. The mezzanine floor is utilized for locker and wash rooms.

The heating system is interesting. It was installed by the American Radiator Co., Chicago, and includes a hot water, coal fired boiler, together with a large number of hot water radiators located under the windows around the walls of the building. The boiler is situated at one end of the building in a concrete pit as shown in Fig. 4. Although the climate is severe, this system is said to furnish adequate heat in the winter with a minimum coal

FIG. 2.—A CORNER IN THE CORE MAKING DEPARTMENT

FIG. 3.—FOUNDRY YARD SHOWING TRANSFER CRANE AND MONO-RAIL

FIG. 4.—HOT WATER HEATER IN FOUNDRY

FIG. 5.—ENCLOSED CUPOLAS WITH WASHROOM ON MEZZANINE FLOOR

consumption. The molding room is illuminated by 11 mercury vapor lamps and ordinary incandescent lamps are used in other portions of the shop.

The molding floor has a net area of approximately 15,000 square feet, and since the plant has a capacity of 25 tons daily, this gives 600 square feet of floor space per ton of output. This corresponds favorably with the floor space requirements of other shops handling similar classes of work. The molding floors are arranged in the usual manner, the heavy work being handled nearest the cupola. The main bay is served by a 10-ton crane equipped with a 3-ton auxiliary hoist, furnished by the Pawling & Harnischfeger Co., Milwaukee. The flasks are stored in the yard under the gantry crane as indicated in Fig. 3. Included in the auxiliary equipment in the shop are two sand shakers, furnished by the Hanna Engineering Works, Chicago.

The foundry is connected to the machine shop and other departments by a mono-rail system over which a traveling electric hoist furnished by the Pawling & Harnischfeger Co., Milwaukee, is operated. The mono-rail connects with the yard crane as shown in Fig. 3 and the hoist is used for handling pig iron, scrap, etc., from the storage piles to the cupola elevator.

The melting equipment includes a 54-inch Colliau and a 60-inch Whiting cupola. The latter has a melting capacity of from nine to ten tons per hour, using 5,000 cubic feet of air per minute with 12 to 14 ounces blast pressure. At the present time the Colliau cupola is lined to 36 inches and the Whiting cupola to 48 inches diameter. The blast for the Colliau cupola is furnished by a No. 10 Buffalo fan while that for the Whiting cupola is supplied by a No. 8 Sturtevant fan. The blowing equipment is driven by an electric motor. The charging floor is 35 feet square, surfaced with steel plates and is provided with a turn table for conveniently manipulating buggies of iron or coke. The charging floor elevator, which is operated by compressed air, was furnished by the Whiting Foundry Equipment Co., Harvey, Ill. The iron mixtures are made from Ashland charcoal pig iron and selected machinery scrap and are melted with Solvay coke.

A 12 x 16-inch air compressor furnished by the Chicago Pneumatic Tool Co., Chicago, is installed in the blower room. It furnishes compressed air for use about the shop. The compressor and the two cupola blowers

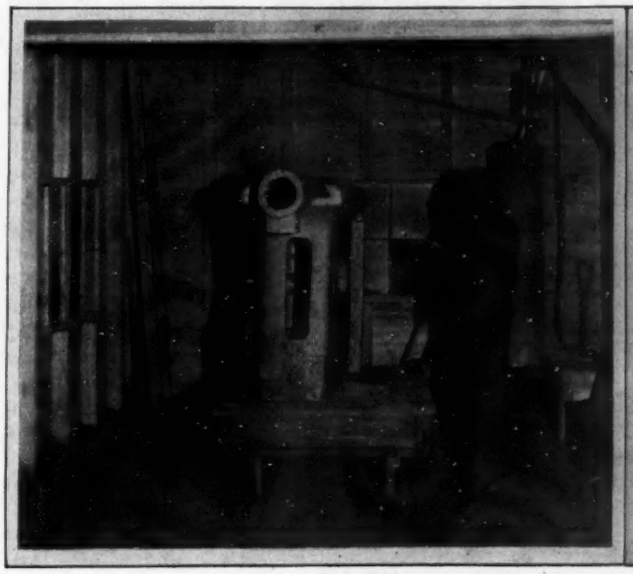


FIG. 6.—SAND BLAST ROOM

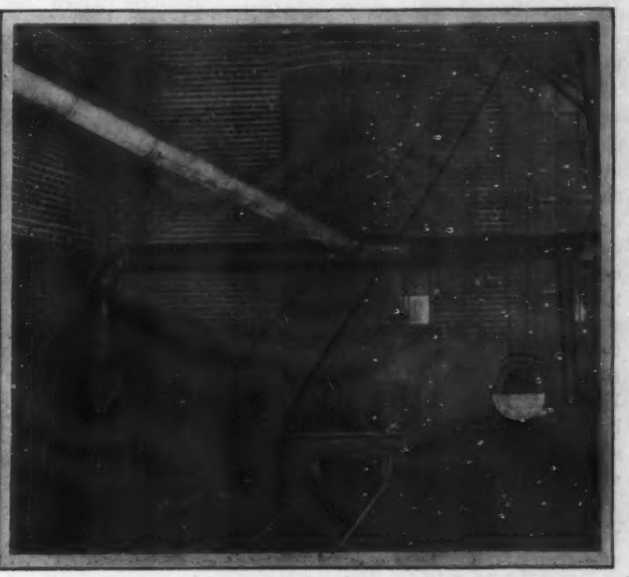


FIG. 7.—A CORNER IN THE CLEANING ROOM

are all connected to a Fort Wayne 75-horsepower, 440-volt motor, which runs 575 revolutions per minute on 60-cycle alternating current.

The melted iron is distributed to the molds in the usual manner using either a 2½-ton or an 8-ton crane ladle or a 2,000-pound truck ladle which runs on an industrial track that extends the full length of the shop.

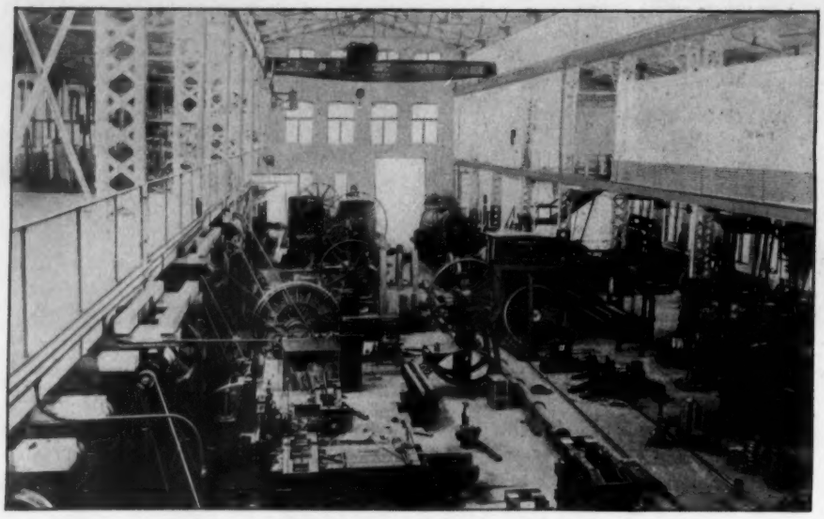


FIG. 8.—MAIN BAY IN THE MACHINE SHOP

The Core Department

The core department, Fig. 2, is located alongside the cupola. It is 35 feet wide and 40 feet long and is equipped with two car ovens provided with rolling steel doors. One of the ovens is 16 feet long, 10 feet wide and 9 feet high and the other is 12 feet long, 8 feet wide and 9 feet high. An air hoist, mounted on a jib crane as shown at the left in Fig. 2 is provided for handling heavy cores.

The cleaning room, which is located in one corner of the shop is 35 feet wide and 50 feet long. The equipment, which is standard in every respect, includes a 48 x 60-inch Whiting tumbler, double emery grinding stands, pneumatic chipping hammers, benches, etc. The dust is exhausted from the tumbler by a No. 4 Sturtevant blower. The Industrial railway enters the cleaning room and is provided with a 6-ton scale for weighing castings. Adjacent to the cleaning room is a sand blast room 10 x 20 feet in size. As shown in Fig. 6, it is provided with a car for handling castings, and a pressure type sand blast apparatus built by the Phoenix Mfg. Co.

For the convenience of the employees, a washroom 20 x 25 feet is located on the mezzanine floor with the blower room. Lockers and other conveniences are also provided. This portion of the shop is exceptionally well heated so that the men are comfortable while changing their clothes or at lunch in the winter time.

For making brass castings, a two-pot Whiting natural draft furnace has been installed in one corner of the molding room. A floor area of about 1,000 square feet is devoted to brass founding

The machine shop connected with the plant of the Phoenix Mfg. Co. is 95 feet wide and 200 feet long. The pattern shop, which is 30 x 75 feet, is located on a gallery in the machine shop. The forge shop is equipped with three fires, an oil burning bar heating furnace, an air driven forging hammer, etc. The surplus patterns are stored in a three-story fireproof building which has a floor space of 5,940 sq. ft. A three-story warehouse, with 12,000 square feet of floor space, also is provided for storing machinery.

The A. D. Granger Co., 90 West St., New York, has recently issued a bulletin describing its Oswego boilers. These boilers are made to conform to the Massachusetts standard and are built especially for high-grade service. The A. D. Granger Co. has recently made an arrangement with the Hawley Down Draft Furnace Co. to build down draft water grates, especially designed for smokeless combustion.

Hot-Rolled Gear Tests

A test to determine the strength of hot rolled gears manufactured by the Anderson Rolled Gear Co., Cleveland, was made recently by James H. Herron, consulting metallurgical engineer, Cleveland. In this process of gear making, drop-forged steel blanks, after being heated, are rotated against a die roll. The method of manufacture was described and illustrated in THE IRON TRADE REVIEW, April 10, 1913.

In the test the gears were examined for strength on a Shore universal testing machine, the load being applied at the pitch line, the yield point being determined by the drop of the pendulum. Hardness was determined by the scleroscope on the periphery of the gear and on teeth which were polished. The depth of case in the case-hardened gears was determined by the microscope. All tests were made in triplicate.

The gears averaged 0.20 per cent carbon, and 0.57 per cent manganese. The other elements were not determined as these two exert the greatest influence on the strength of the gear. All gears were of six-inch pitch diameter, six to eight pitch.

Tests of the normal hot rolled gear gave the following results: Yield point 7,918 pounds; ultimate strength (complete failure) 13,645 pounds; hardness 26. For the case-hardened gear, the tests showed: Yield point, 14,750 pounds; ultimate strength (complete failure) 19,130 pounds; hardness 85; depth of case 0.035 inches.

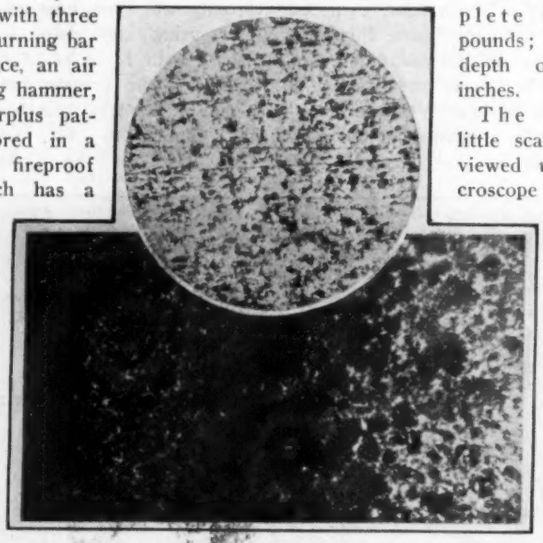


FIG. 1—STRUCTURE OF NORMAL GEAR

FIG. 2—STRUCTURE OF CASE HARDENED GEAR

The gears showed little scale and when viewed under the microscope at 100 magnifications its thickness was inappreciable. In Fig. 1 is shown a microphotograph of a normal gear while in Fig. 2 a case-hardened gear is illustrated. The magnification is 50 diameters. The illustrations show that the structure of the material has been refined in the rolling operation.

The Ohio Galvanizing & Mfg. Co., Niles, O., has let the contract for an addition to its plant.

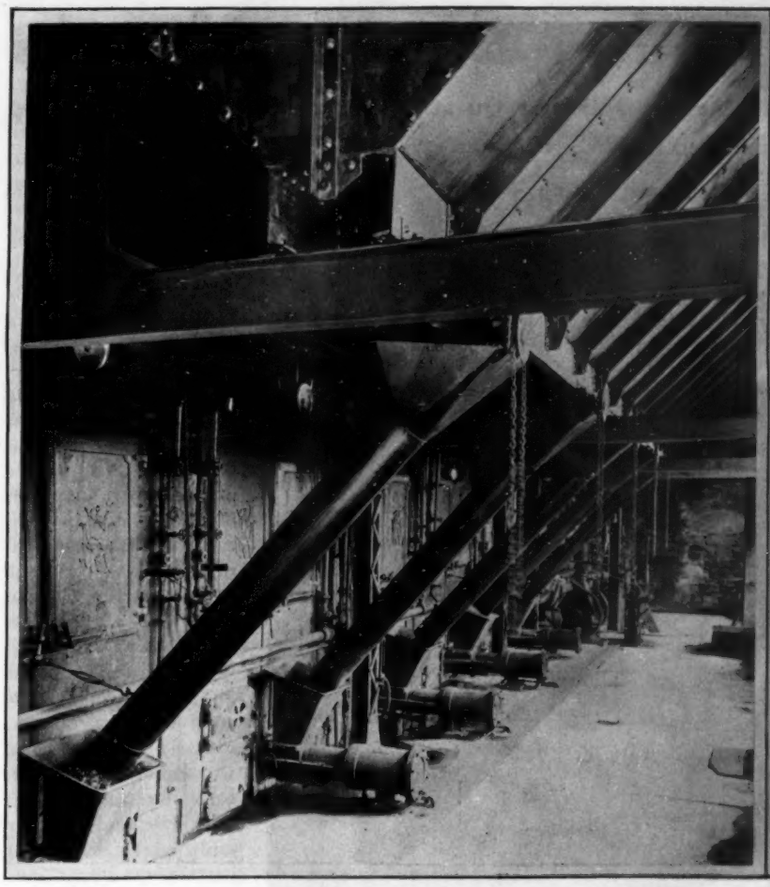


Fig. 1—The coal drops from the storage bins directly into the stokers

Fig. 2—The coal and ashes are handled by the same elevator

Cutting Boiler Room Costs

But One Elevator is Used for Handling Both Coal and Ashes—Hand Labor is Eliminated

THE DEVELOPMENT of automatic apparatus for handling materials from one level to another is one of the important features of modern shop practice and a number of unusual installations have been made recently embodying some new ideas. Among others, the Chain Belt Co., Milwaukee, has been prominent in this field. Figs. 1 and 2 show the details of a coal and ash handling system designed by this concern for a large Milwaukee manufacturer. The system is applicable to any sort of power plant.

The coal is spouted into the boot of the elevator from wagons or cars, a grating preventing large lumps passing until reduced to proper size for the stokers to handle. After elevation it is discharged into a spiral conveyor running the length of the 85-ton steel storage bin. Valves operated by chains and sheaves from the boiler room floor direct delivery of the coal to any portion of the bin. Similar valves and chain control are provided for each of the five spouts delivering coal to the stokers, the hoppers being kept filled automatically from the spouts. No hand labor is required after the coal is delivered into the elevator boot.

Handling the Ashes

The ashes are dumped into the same boot hopper, the clinkers being broken small enough to pass, and are delivered into the same head chute used for coal. A fly valve operated from the boiler room floor directs the ashes into an 8-ton bin, which is shown projecting above the roof in Fig. 2. From this bin a chute allows discharge into a wagon or car below.

The drive and elevator chain are of a standard type. A five-horsepower motor operates the entire system and one man can handle the five boilers

Curb and Corner Bars

An interesting eight-page bulletin recently has been issued by the Trussed Concrete Steel Co., Youngstown, O., describing a new form of curb bar for protecting the concrete edges of curbs, columns, shipping platforms, steps, etc. This bar can be applied advantageously at many points in factory buildings, where the corners of posts, platforms, etc., are in danger of injury through collision with heavily loaded trucks or other objects. The curb bars are rolled from open-hearth steel and are heavily galvanized after forming. They are provided with an open anchorage which does not separate the concrete and eliminates the tendency of the cement to split at the corners.

Gas Engines for Steel Plants

A Discussion of A. Dyckerhoff's Article On Power Questions in Steel Mills Which Appeared in Recent Issues

BY HEINRICH J FREYN

IN RECENT issues of THE IRON TRADE REVIEW there appeared an article by A. Dyckerhoff on power questions in steel mills. This article is largely devoted to the question of the most economical type of equipment of electric central stations in blast furnace and steel plants, and it can be summed up in the statement that the author after discussing the principal phases of the problem concludes that the installation of boilers and steam turbines in steel plants is preferable to that of blast furnace gas engines. The author refers in his article largely to European, and especially to German practice and to foreign publications on this much debated question and, from the tenor of his article, it would appear to the casual reader that the warfare between the advocates of the gas engine and those of the steam turbine is now finally and definitely concluded, and that the laurel wreath of victory has been won by the supporters of steam power in steel mill practice. This presentation of the matter, however, does not correspond to the facts, and I desire to correct the wrong impression which a perusal of the article in question is liable to create in the minds of the uninitiated. The controversy whether steam or gas equipment in blast furnace and steel plants is more profitable is as old as the gas engine and the steam turbine themselves, and, judging by past experience, it will never be settled to the satisfaction of everybody as long as gas engine and steam turbines exist. In 1911 Hubert Hoff, of Duedelingen, Germany, read a voluminous paper before the annual meeting of the Verein Deutscher Eisenhuettenleute, at Dusseldorf, which was subsequently published in Nos. 25, 27 and 28 of *Stahl und Eisen*, 1911. After going very exhaustively into the various questions concerning the power supply of the German steel plants by means of blast furnace gas, Hoff decries in his paper as uneconomical, the extensive use of electric power for operating rolling mills in Germany and assails the practice of German iron and steel manufacturers of using the blast furnace gas engine for the generation of electric power in the central stations of their plants in preference to the combination of boilers and steam turbines. Mr. Hoff bases his deductions and his adverse criticisms of the gas engine upon data received from 29 steel plants in Germany and Luxemburg in answer to a circular letter which he had sent out and which contained certain questions concerning their power plant equipment. Mr. Hoff's paper and its subsequent publication in Stahl und Eisen, aroused a storm of criticism all over Germany, and it was shown in both verbal and written discussions, and in many communications to the editor of Stahl und Eisen that the premises on which Mr. Hoff's conclusions had been based were in many instances inaccurate, since a number of the blast furnace and steel plants had misinterpreted and thus incorrectly answered the list of questions. In view of these criticisms, Mr. Hoff subsequently revised the summary which he had given in his original paper showing the shortcomings of the gas engine without, however, modifying his conclusions to any large extent. A great many statements in Mr. Hoff's paper, and especially certain assumptions regarding the cost of installation, thermal efficiency and reliability of gas engine operation, were vigorously denounced by many of his critics, who claimed that Mr. Hoff had not presented the subject in a spirit of impartiality, and it was intimated that in his contribution to the question at issue—as will invariably be the case in such controversies—"the wish had been

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father to the thought". The discussion, in which university professors, manufacturers of both gas engines and steam turbines, steel plant managers, blast furnace superintendents, consulting engineers, power plant operating engineers and many others participated, went merrily on during nearly three years and contributions to the subject appeared at more or less frequent intervals in *Stahl und Eisen*. Some critics advanced new and many others simply reiterated old and worn-out arguments in favor of or against Hoff's conclusions.

Many Have Axes to Grind

The net result of the debate which at times grew heated and almost personal was that today opinions regarding the question are just as divided and apparently just as irreconcilable as they ever were. Today, after the smoke of battle has cleared away, it is evident that the outcome could not have been different because too many participants in the controversy on both sides have "an axe to grind".

In the face of all discussions pro and con which appeared and occasionally still appear in the technical literature abroad and in this country, gas engine builders, at least in Europe, have at present more orders to fill than ever, and the latest and most modern steel plants in Germany, Adolf-Emil Huette at Esch and the new Thyssen plant at Hagendingen, built only about two years ago, are equipped with large gas engine electric power stations to the exclusion of boilers and steam turbines.

A great majority of the older plants abroad continue as well to extend their power stations by installing gas engines, and collieries and coke oven plants are falling in their steps. In this connection I would mention only a few of the most prominent steel plants: Differdingen, Rheinhausen, Deutscher Kaiser, Friedrich-Wilhelmshuette, Hoesch, Hoerde, Union, Cockerill and the collieries Alsdorf, Heinitz, Rheinpreussen, Bonifazius, Prinz Regent, as well as a large number of other German, Austrian, French, Belgian and English steel plants and collieries.

In view of this development, I felt justified in making the statement in my paper, "The Gas Engine in Modern Blast Furnace and Steel Plants", read before the annual meeting of the American Iron and Steel Institute in 1913, that "practical steel makers and coke producers have found their own answer to this question and continue to disregard academic objections raised against a development which they have found by experience to be right and profitable".

As far as the situation in this country is concerned, attention is called to my aforementioned paper wherein actual cost figures and operating results of a number of gas engine and steam turbine plants in the United States are given. The tabulated information given in this paper by courtesy of the United States Steel Corporation concerning cost of installation, operating expenses and thermal efficiency which covers particularly the results obtained in the largest gas engine plant in the world installed at the steel plant at Gary, Ind., represents not mere personal opinion or preconceived views, nor is it the result of individual, carefully prepared and conducted record tests, but states the actual, tangible results of practical, commercial operation of such plants extending over a period of several years. Every practical blast furnace and steel man will agree that solely such practical data can be considered as of real value for correct conclusions. Not until advocates of steam equipment for steel mills are in a position to furnish similar incontestable proof founded on experience obtained in commercial operation of such plants can the cool-headed steel master afford to deviate from the path which he has recognized as leading in the right direction.

The Question of Regulation

One of the most common criticisms of the gas engine driven generator is the "difficulty of regulation" and the resulting troubles of parallel operation of gas engines. This point has been brought up so often that it seems unnecessary to constantly reiterate that the steam turbine is superior to the reciprocating engine in uniformity of rotation. This fact is undeniable and self-evident; and while "perfect regulation", as such, may be, and undoubtedly is, a very excellent and desirable quality of a prime mover, the question which the practical steel mill owner will ask himself is whether for his purposes such "perfection" is absolutely necessary, or whether in view of other compensating advantages of the gas engine, he is justified to make certain concessions on this score. Upon investigation, it would be found that indeed the latest gas engine power plants in Germany furnishing power to steel plants and rolling mills are regulated and operated in parallel to all intents and purposes beyond reproach. If certain gas engine plants built a number of years ago, perhaps with insufficient experience, gave trouble in parallel operation until certain improvements and alterations were made on governing mechanism and gearing, this does not prove any more conclusively that *all* gas engines regulate badly and "make parallel operations sometimes impossible" than the deduction would be warranted that because of certain mechanical defects on steam turbines of one type, *all* steam turbines, collectively speaking, should be condemned and relegated to the scrap pile.

Modern gas engines with modern valve gear and modern mixture formation regulate quite well in spite of "intrinsic forced oscillations", and the electrical engineers in charge of such plants are entirely satisfied with their operation in parallel.

The "Factor of Utilization"

In order to compare the performance of power plants when the load factor is not known beforehand, there is no more adequate basis for such comparison than the "use factor", or "factor of utilization", as the German term *Ausnutzungs faktor* could be translated; this factor shows the ratio of the actual number of kilowatt hours produced during one whole year to the number of possible kilowatt hours which could have obtained if the power plant had operated at its maximum continuous rating during 8,760 hours.

The influence of the length of time over which such comparisons extend is by no means merely a local problem, but it is of vital importance if comparisons of any practical value are to be drawn. It is evident that tests of one hour, or even one day, will show results entirely different from actual, average figures obtained during operation of a power plant extending over a whole year. This is especially true of boiler and steam turbine plants where the "personal equation" of firemen and engineers has so great a bearing on the plant efficiency, and where, owing to conditions beyond the immediate control of the blast furnace operator, the regular supply of steam of the desired pressure and quantity, generated by blast furnace gas, cannot be vouchsafed at all times. That this "practical" argument on which I elaborated in my aforementioned paper is a very serious one and cannot and should not be passed over lightly, is acknowledged by every practical blast furnaceman and power plant

operator, and great stress is laid upon this very point in the discussions of Mr. Hoff's paper in *Stahl und Eisen.*

It is frequently claimed that the reliability of the blast furnace and coke oven gas engine is unsatisfactory, and the low "use factor" of certain gas engine plants is pointed to as proving this assertion; but the "use factor", or "factor of utilization", of steel mill power plants depends very largely upon the condition of the iron and steel business. Particularly in our country, times of great prosperity alternate with periods of utter depression. In such times of dullness the "use factor" of any steel mill power plant will naturally be extremely low because the mills are idle. It is absurd to blame unreliability of the gas engine for such a condition of affairs, and yet this is frequently done without previous careful investigation of the underlying causes.

Overload Capacity

Gas engine critics invariably attack the lack of overload capacity of the internal combustion engine, particularly in connection with the question of "rating" of a power plant, which must be stated if the use factor is named and if installation costs per kilowatt are compared. It is a very difficult problem to arrive at a mutually satisfactory understanding on this point because steam turbine enthusiasts dislike exceedingly to make any concessions in the matter of overload capacity of the steam turbine. However, steam turbines for electric power plants must operate electric generators, and thus their rating is necessarily limited by the capacity of the alternator. Manufacturers of electrical machinery cannot be blamed if they decline to sell a generator of 6,000-kilowatt capacity at the price of a 4,000-kilowatt unit, particularly at present low prices, and in view of the existing keen competition in the electrical field.

What advantage is there, then, in having a steam turbine capable of a continuous overload of 50 per cent if the direct connected generator cannot carry much over 25 per cent overload without excessive heating?

The method generally used by public service corporations of rating their equipment according to the maximum 24-hour capacity at 40 degrees Cent. temperature rise of the generators, which I adopted as a fair and equitable basis in my paper for rating all prime movers for comparison of the investment in such plants has met with the approval of many engineers, and in commenting on my paper in *Stahl und Eisen,* Professor Dr. Stauber, of Berlin, suggested that this method should be generally adopted to eliminate all possible arguments.

The application of the scavenging and surcharging system on 4-cycle gas engines provides for a considerable overload capacity amounting to 30 to 40 per cent of the nominal rating based upon 70 pounds per square inch mean effective pressure in the gas cylinders. This innovation thus places the gas engine very nearly on the same footing as the steam turbine as far as over-load capacity is concerned if the limiting influence of the direct connected generator is considered.

The three most prominent gas engine manufacturers in Germany have developed the scavenging and surcharging system independently and this important improvement in gas engine practice has very successfully been applied in a number of plants abroad. One of its greatest advantages is the fact that owing to this improvement, the number of units required for a certain plant capacity is considerably reduced so that for a given maximum overload, the plant investment is much smaller than with gas engines of the old 4-cycle type. Moreover, the net operating expenses per unit of electric power are lower and the thermal efficiency is higher since the increased capacity is obtained by virtue of improvements in the operating cycle itself. The same operating labor, the same amount of oil and cooling water will take care of the increased output which formerly were necessary for a plant of the ordinary type.

Effect of Scavenging and Surcharging

The mean effective pressure obtained by the application of this system can be as high as 90 pounds per square inch or more and this increase is obtained without increasing the initial pressure or the average temperature of gas cylinders, pistons, cylinder heads and other working parts. Tests made on engines equipped with this innovation showed that the amount of heat carried off by the cooling water is the same at 89.5 pounds mean effective pressure with scavenging and surcharging as it is at 70 pounds without scavenging. In both cases the temperature of cylinder walls, pistons, cylinder heads, etc. and consequently the heat stresses are the same from which it follows that the life of these parts as well as the oil and cooling water consumption are the same in spite of the increased output. Since the heat losses in the cooling water reduced to the brake horsepower basis are less with scavenging and surcharging, the gas consumption is correspondingly lower.

The same tests show, furthermore, that the mechanical efficiency of the scavenged engine is better than that of the unscavenged engine, notwithstanding the necessity of scavenging and surcharging turbo-blowers.

The gas consumption guaranteed by builders of scavenged and surcharged engines is about 12,000 brake terminal units per kilowatt between full and three-quarter loads.

Interesting Cost Figures

The financial situation resulting from the introduction of this innovation can easily be judged if the effects on a gas engine station of 10 units of 2,700 kilowatts maximum continuous rating each, is considered. Alternators of 3,000 kilowatts rated capacity may be direct connected to the existing engines. The application of the scavenging and surcharging system would result in an increased capacity of at least 700 kilowatts per unit or 7,000 kilowatts for the complete station. Compared with the original capacity, this improvement would realize an increase of the maximum continuous rating of 26 per cent and in addition give a maximum temporary overload of 15 per cent above that figure. The existing generators would easily take care, without heating, of the corresponding increased load which amounts to about 11 per cent above the nominal rating.

The cost of installation of the scavenging and surcharging system in such an existing station would be about $200,000 including the three necessary turbo-blowers direct connected to steam turbines operated by steam raised by means of the heat in the exhaust gases in exhaust heat boilers and including the necessary changes in and additions to the gas, air and exhaust piping together with whatever slight changes are necessary in the valve setting and retiming of the existing valve gear.

The addition of 7,000 kilowatts would, therefore, cost only $28.50 per kilowatt and not to exceed $32.00 per kilowatt including a modern up-to-date gas cleaning plant.

(*To be continued.*)

Schum Brothers, Metropolitan Tower, New York, have recently issued a bulletin describing a new nut lock which has been placed on the market by this concern. The Schum nut lock consists of a set screw fitted in the end of the bolt and so arranged that it moves the thread in or out of alignment, locking or unlocking the nut automatically. After the thread has been locked, the set screw is removed.

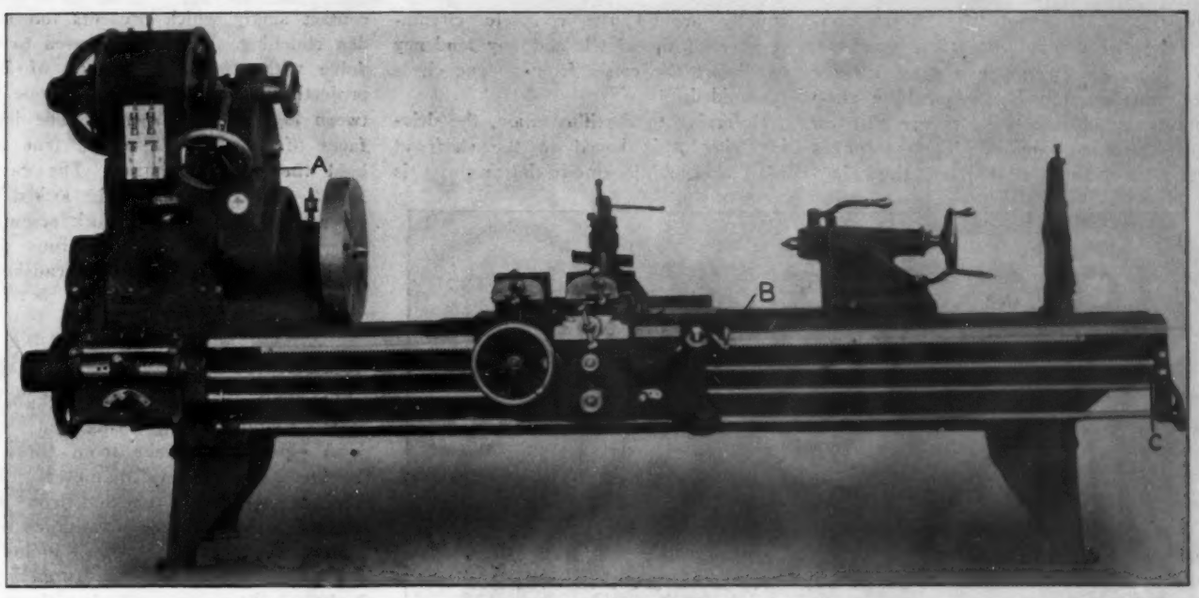


Fig. 1—Le Blond Lathe Equipped with Adjustable Motor and Automatic Starter

Simple Adjustable Speed Motor

In the Reliance Type Proper Regulation is Secured by Turning a Small Hand Wheel

MOTOR-DRIVEN machine tools in practically all lines of manufacture meet very severe working conditions due to frequent starting, stopping, or reversing and changing of speeds. Unless particular attention is given to these operations, both the motor and the tool are subjected to severe mechanical strains. Automatic starters which prevent the possibility of either too excessive or too low starting currents are gaining in favor for meeting the difficulties encountered in starting and stopping the motor. Adjustable speed motors are designed to provide means of securing speed changes.

The Reliance Electric & Engineering Co., Ivanhoe road, Cleveland, has had success with its type of adjustable speed motor, which provides an unlimited range of speed changes and is entirely independent of the starting apparatus. As shown in Fig. 2, the speed adjustment mechanism is operated through a small hand wheel.

This motor is of the armature shifting type, and is especially designed for the individual drive of all classes of machinery requiring changes in speed in order to give maximum efficiency and output under changing conditions of work or material.

The speed adjustment is obtained by gradually shifting the motor armature along its axis and away from its normal position directly under the main field poles, resulting in a gradual but continuous change in speed. A forked lever, pivoted between two lugs projecting from the inner face of an arm of the end yoke, engages on each side of the thrust bearing box at the end toward the armature.

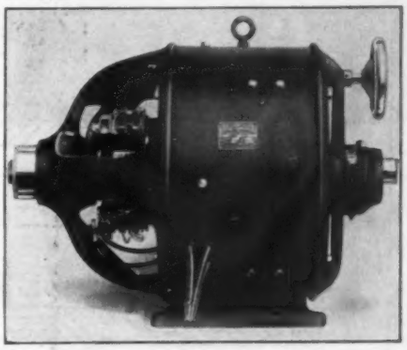


FIG. 2—VIEW SHOWING POSITION OF ARMATURE FOR HIGHEST SPEED

The outer end of this lever is pinned to a short rod, which, in turn, is fastened securely to one end of the speed adjustment nut. A small shaft, on which the hand wheel is mounted, passes through an arm of the yoke and engages at its threaded inner end with the speed adjustment nut. This shaft is prevented from moving laterally by collars both inside and outside its bearing in the end yoke. Turning the hand wheel, therefore, imparts lateral movement to the speed adjustment nut and this, in turn, by means of the rod and lever, imparts a similar movement to the thrust bearing box and armature.

It is claimed for this type, that with the armature in any given position the motor practically becomes a constant speed motor, which under all conditions maintains a fixed speed until the position of the armature is changed by the operator. The withdrawal of the armature from the main field is claimed to result in practically no sacrifice of electrical efficiency. Some of the advantages claimed for the Reliance motor in addition to the infinite number of running speeds, and ranges in speed as high as 1 to 10, are: No field resistance controller is necessary; the speed control is mechanical and cannot be manipulated in any way which will damage the motor, and is entirely distinct from the other operations of the motor.

The Reliance motor has been installed with practically all designs of machine tools. In Fig. 1, it is shown connected to a 21-inch LeBlond heavy duty lathe and equipped for automatic starting. The hand wheel is shown at *A*. An automatic starter controls the starting speed and reversing of the motor, through a small drum switch at *C*. This switch is operated from the lathe apron by the handle *B*. In starting, stopping or reversing, the machinist throws this handle and the starter automatically does the rest.

In Fig. 3, the motor is shown connected to a pipe threading machine. Working conditions in a pipe mill are different from ordinary machine shop practice and impose a severe test on all motor equipment. The motor is connected to the rear of the pipe-

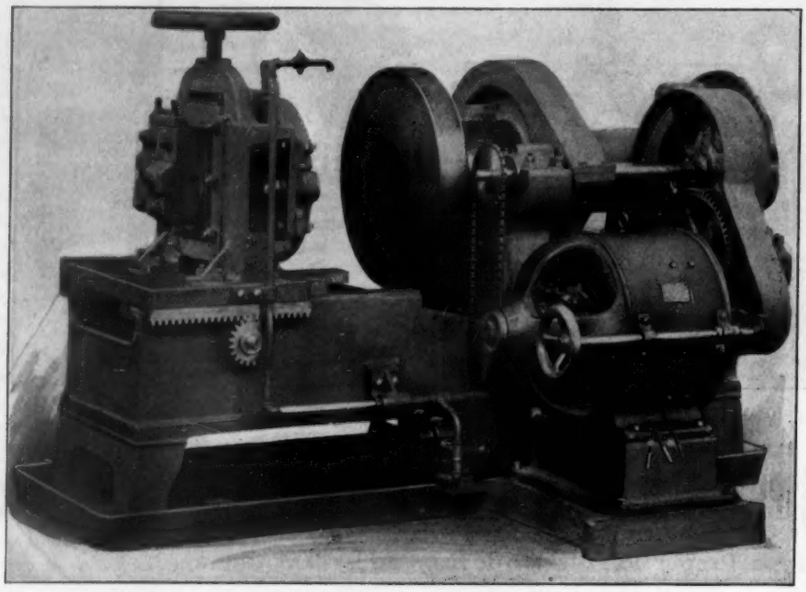


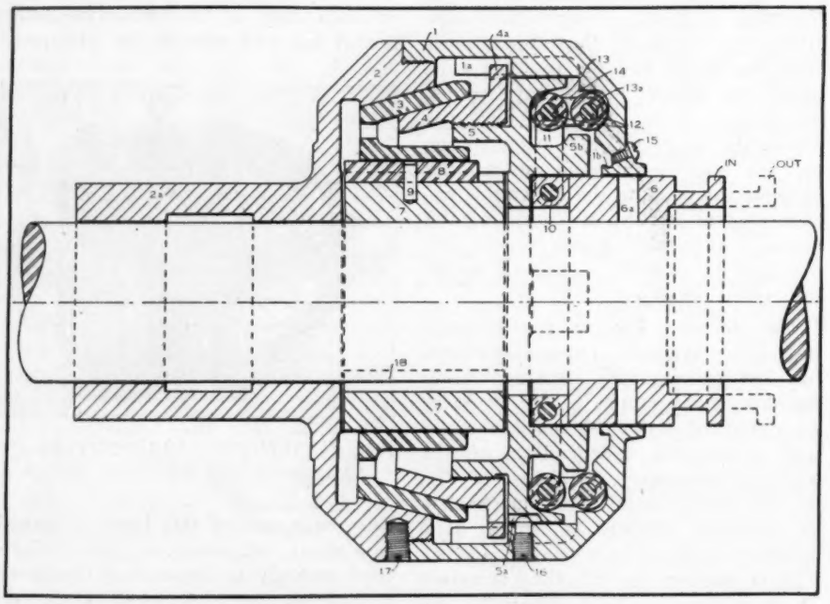
FIG. 3—HEAVY DUTY PIPE THREADING MACHINE FITTED WITH RELIANCE ADJUSTABLE SPEED MOTOR

threading machine away from the operator and proper speed adjustment can be secured by a foreman or electrician, leaving the workman free for the ordinary mechanical operations.

Multi-Cone Friction Clutch

A multiple disc cone clutch of original design recently has been placed on the market by the Akron Gear & Engineering Co., Akron, Ohio. This clutch is designed to combine the simplicity and large pulling power of the ordinary two cone clutch with the well known advantages of the multiple disc clutch. Its diameter is comparatively small and it is also light, which permits its being employed on line shafts running at high speed. To avoid a too sudden engagement of the cones, their face angles are greater than those of the ordinary two-cone clutch, and the clutching force and pulling power so lost is compensated by the addition of a third cone. The cones run constantly in oil with oil films between them. These oil films permit a certain amount of slippage before the cones come into engagement. The clutch has no projecting parts and all of the working parts are enclosed in a cylindrical oil tight and dust-proof casing. It is said that the horizontal pressure exerted by the throw-in mechanism is distributed equally around the complete circumference of the clutch and any tendency to distort the cones from a true circle is avoided.

Referring to the illustration, the driving ring *7* is keyed to the shaft at *18*. The middle or driving cone *3* is driven by *7* through two feathers *8*; both friction surfaces of this cone contain oil grooves. The driven cones *2* and *4* are brought into contact with cone *3* when shifter sleeve *6* is pushed in, thus throwing rollers *13* outward and forward against adjustment ring *5* which carries cone *4* forward into contact with cone *3* and the latter into contact with cone *2*. The cones come into contact singly which prevents too sudden clutching. Cone *4* is caused to revolve with cone *2* by means of lugs projecting outward on *4*. They ride between lugs *17* on casing *1*. The inner faces of lugs *1a* are turned true and hold the ring *5* central. The casing screws on cone *2* and is locked by screw *17*. Inner end of lock screw *16* inserts into one of the numerous slots *5a* in outside periphery of *5*, causing *5* to revolve with the casing.



SECTIONAL VIEW MULTI-CONE CLUTCH

Threaded Cast Iron Pipe

James B. Clow & Sons, Chicago, are now manufacturing threaded cast iron pipe in all sizes from three to twelve inches in diameter. The threaded coupling for cast iron pipe is said to have many advantages over the customary lead joint, including increased strength and freedom from leakage. It is believed that threaded couplings will permit cast pipe to be used in many places where the danger of corrosion is great, where heretofore other forms of tubing have been employed.

A 48-page booklet has been issued by the Clow company, describing the new form of pipe and also giving specifications and dimensions of various forms of valves for use in connection with cast iron mains. In addition, the booklet contains the revised American standard specifications for flange fittings, as adopted recently by the American Society of Mechanical Engineers and the Manufacturers' Standardization Committee.

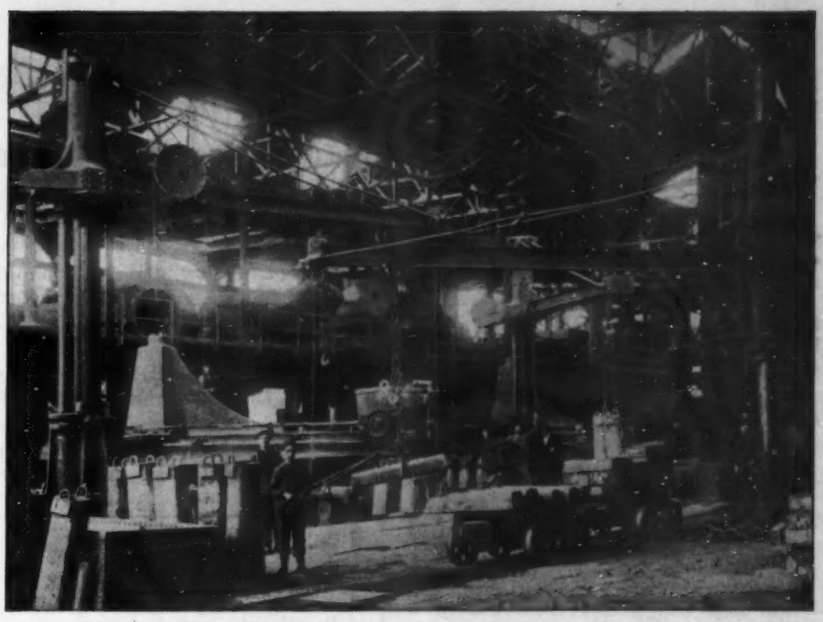
The whole idea of our safety movement is co-operation with the men.

Steel Plants in the War Zone

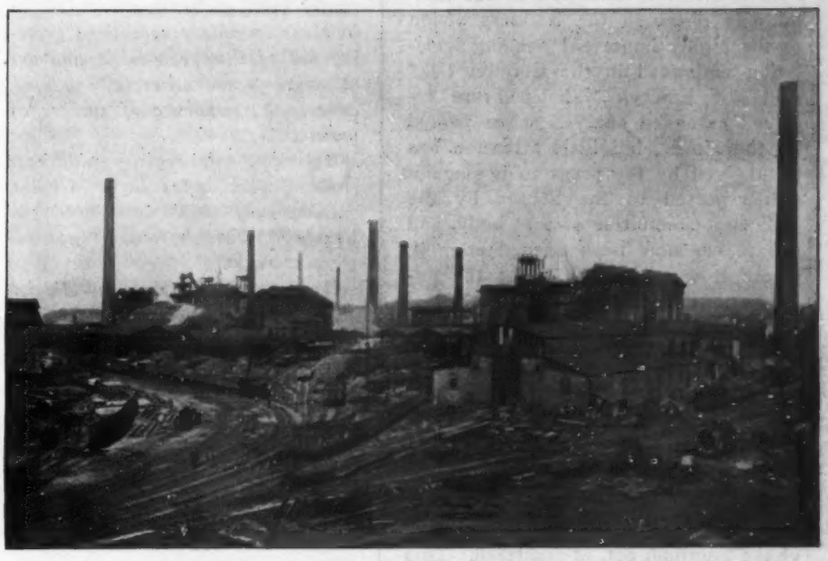
ON THIS PAGE we reproduce views of some of the large steel plants in Belgium, along the Meuse and Sambre rivers, which are in imminent danger of destruction by the armies now contending for supremacy in Europe. The iron and steel development along the Meuse river and its tributaries between Liege, Namur and Charleroi is similar to that in the Monongahela and Allegheny valleys near Pittsburgh. We only have to imagine what would happen to the iron and steel development of the Pittsburgh district if two armies, each numbering several hundred thousand men, were operating in that territory, to realize the predicament in which the Belgium iron industry finds itself today.

The steel works of Belgium are modern and up-to-date in every particular and include extensive facilities for manufacturing both Bessemer and open-hearth ingots and finished products of all kinds. Taken together, they have a capacity of over two million tons of ingots annually of which fully 85 per cent are produced in the Meuse and tributary valleys. In 1913, Belgian steel plants exported 648,000 tons of their product.

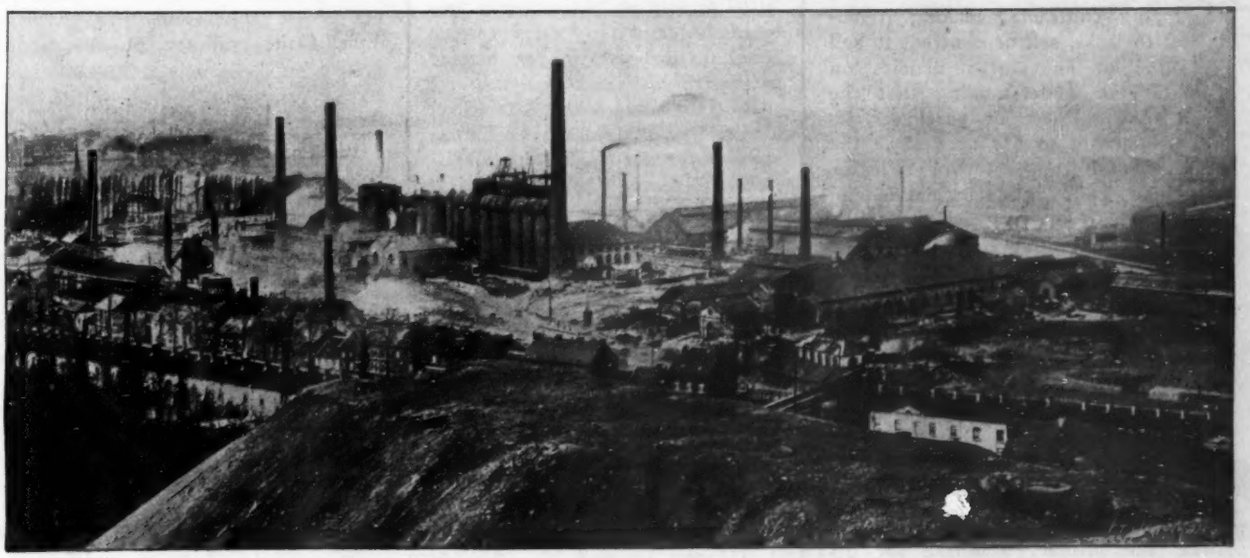
Even if the plants in the affected district do not suffer any great physical damage, the business of the companies for the time being is absolutely paralyzed and it is estimated by competent authorities that it will require at least five years for the industries in the war-ridden district to resume their normal condition.



INTERIOR OF A BELGIAN BESSEMER STEEL WORKS
Societe De Thy-Le-Chateau, Charleroi



PLANT OF SOCIETE DE THY-LE-CHATEAU, CHARLEROI



STEEL WORKS OF SOCIETE METALLURGIQUE AT HAINANT, COUILLET

Business News from the Capitol

James A. Emery Strongly Criticises Anti-Trust Bills and Points Out Faults—Passage Will Not Affect Pending Suits

Washington, Aug. 18.—Sharp criticism of labor and other provisions contained in the Clayton omnibus and the Federal Trade Commission anti-trust bills was made in an interview granted to THE IRON TRADE REVIEW today by James A. Emery, counsel for the National Association of Manufacturers. A student of legislative measures, opinions expressed by Mr. Emery are always concise, well considered and of the utmost interest to the manufacturing world.

He finds numerous faults with the two bills and points them out in a vigorous manner.

"The cloud of foreign war has temporarily obscured the business vision to the highly important pending legislation embraced in the Clayton bill," said Mr. Emery. "The measure received extended analysis when passed by the House, but little attention has been given by the press to it since it was reported to the Senate by the Judiciary Committee of that body, and debate has now been opened upon it, where it will continue to be the unfinished business of the Senate.

"The chief changes in its form have not removed the substantial objections made to the dominant features of the bill as it passed the House. Price discriminations, with purpose or intent to 'wrongfully injure the business of a competitor', will remain unlawful. This ambiguous standard, supplementing the interpreted language of the Sherman act, is unaltered. This is equally true of the section relating to 'typing contracts', making it unlawful to lease, sell or contract to sell 'patented or unpatented' articles on condition or understanding that the price to the lessee or purchaser requires him not to use or deal in the goods of the competitor or a lessor or seller. These acts remain unlawful in the Senate bill, but are to be prevented by executive orders of trade commission and are not made a misdemeanor.

"This will create a situation, if enacted, the more astonishing because it proceeds from those who declare their opposition to 'government by injunction'. The trade commission, reinforced by the courts, is to govern and regulate the business of a hundred million people through 'executive' injunctions aimed at trade practices, the primary standard for determining the legality or illegality of which is to be found in the breast of the commission and not in the statute of Congress directing the commission's activity.

"It is, moreover, singular that the commission, reinforced by the courts, is authorized and directed to enjoin all forms of 'unfair competition', many of these forms undoubtedly constituting crimes, both under the Sherman act as interpreted and the supplementary legislation intended to reinforce it. Mr. Gompers and those who have supported his demands, which are declared to be specifically comprehended within this bill, have again and again asserted that no act which is a crime ought to be enjoined, yet this bill will at once direct both executive and judicial restraint of acts which it elsewhere defines as crimes, and Mr. Gompers demands, under pain of political displeasure, support of a measure predicated upon a principle which he has declared infamous.

"The seventh and eighteenth sections of the House bill, intended to fix the status of labor and agricultural organizations and to restrict the injunctive powers of federal courts in labor disputes, is altered by striking out that portion of Section 18 prohibiting the restraint of 'peaceful picketing', and in the eighteenth section the provision that none of the acts enumerated in that paragraph should be held to be unlawful is changed by providing that none of the acts therein specified shall be held to be violations of the 'anti-trust acts'. If, however, there is any doubt as to the purpose of these sections it is overcome by the declaration of the Committee of the Judiciary in its report that these sections are intended to 'exempt' labor organizations from the operation of the anti-trust act. The committee thus now explicitly admits an intent which has hitherto been denied or dissembled.

"The final provisions of the measure, giving the right to trial by jury of violations of orders of district courts, when committed in the presence of the court or so near thereto as to obstruct the administration of justice or when the government is party, remain unaltered. The bill thus explicitly admits its purpose to exempt labor organizations from the operation of the trust statute, to interpose trial by jury in the enforcement of judicial defense in an enormous variety of private suits, and thus to make difficult the enforcement of practical justice."

Activities at the National Capitol

Prominent manufacturers, shipping representatives and bankers confer with government officials as to plans to relieve conditions growing out of European crisis, and are at work upon concrete solutions, expressing confidence of success of undertaking.

American ship registry bill, near passage, precipitates lively debates.

Emergency bill introduced in Senate to bond cotton by government warehouse system.

Amendment to Vreeland-Aldrich act adopted, enlarging emergency currency measure to relieve pressure throughout country and prevent enforced abnormal settlement of indebtedness while war disturbance continues to affect this country.

Numerous suggestions made to relieve cotton interests.

Bill introduced by Senator Williams permitting towns of less than 50,000 to join in placing their combined bonds with federal reserve banks to get money for moving cotton crops.

In interview with THE IRON TRADE REVIEW, *James A. Emery, counsel for the National Association of Manufacturers, criticised trust legislation.*

Effect on Pending Suits

Washington, Aug. 18.—"It is my understanding that passage of the anti-trust bills now before Congress will not in any controlling or decisive way affect pending litigation between the government and corporations," said Attorney Wade H. Ellis, of this city.

Mr. Ellis was five years assistant to the attorney general of the United States, having been appointed by President Roosevelt, serving under Attorney General Bonaparte, and was continued in the Department of Justice under Attorney General Wickersham during President Taft's administration. In this capacity, he had charge of anti-trust litigation. Pre-

What the Government is Doing

President Discusses Business Conditions, Needs of Railroads and Trust Question—Conference on Export Problem

vious to serving in the Department of Justice he was attorney general of Ohio. Frequently he represents steel interests in important cases before the Interstate Commerce Commission and in the courts, and because of his broad experience his opinion is regarded highly.

The Federal Trade Commission bill, now in conference, and the Clayton omnibus measure, recently laid before the Senate for consideration, will not be an element of any kind, he thinks, in such suits, for instance, as those pending against the United States Steel Corporation, the American Can Co. and the International Harvester Co.

Referring to those cases, Mr. Ellis said that all of the issues are made up and the battle line determined.

"The questions involved in those cases," he continued, "undoubtedly will be fought out under the existing law between the government on the one hand and the corporations on the other hand. It is not likely that anything which it is charged in those cases is unlawful would be made lawful by the pending bills, and, conversely, it is not probable that the complaint would be so amended as to make lawful that which it is contended is unlawful.

"As I see it, the Federal Trade Commission bill is merely a measure enlarging the powers of the Bureau of Corporations and taking over the duties of that organization. The measure provides for inquiry by the proposed commission where a charge of unfair competition is made by a competitor or the government. The commission is not given any judicial power, but would turn over its findings to the Department of Justice."

President's Views on Trust Legislation

O. DeG. Vanderbilt Jr., president of the Weir Frog Co., Cincinnati, who was recently called into consultation by President Woodrow Wilson in regard to the railroad situation in this country at the present time, states that in his opinion the United States should have prosperous times in spite of European conditions. Mr. Vanderbilt is of the opinion that railroads are in need of relief, and feels that this needed relief will be forthcoming as soon as ways and means can be decided upon which will protect the interests of the shipper as well as the railroad. Speaking of his interview with President Wilson, Mr. Vanderbilt made the following statement to THE IRON TRADE REVIEW:

"The President realizes very keenly the extremely bad condition and lack of business of the manufacturers in this line of work, due to the very stringent economy which the railroads of the country have been forced to put into effect on account of the uncertainty as to future legislation affecting them, which has made it a very difficult matter to influence capital for badly needed new construction.

Needs of Railroads

"He also realizes that this lack of buying, even of such necessary supplies as special track work for the maintenance of already existing lines, is due in a large measure to the reduced earnings, and he agrees thoroughly with the report of the Interstate Commerce Commission that the railroads are in need of relief and feels that this needed relief will be forthcoming as soon as ways and means can be decided upon which will protect the interests of the shipper as well as the railroads.

"The President feels also that certain basic legislation is necessary before the business interests of the country can be put on a sound basis. As soon as this basic legislation is in force, it will be the attitude of the administration to remove all uncertainty as to future legislation and the position of the administration toward business. With conditions fundamentally sound and the doubt as to the attitude of the administration removed, I thoroughly agree with President Wilson that this country should have prosperous times in spite of European conditions.

The European Question

"As regards the present situation in Europe, the President feels, and I agree with him, that this country is in an admirable position to withstand the influences which will be brought about by the conflict abroad. The crisis in the financial world I believe has been passed and that the administration, financiers and the business men of the country will be amply able to take care of any conditions which may arise and I believe they have the confidence of the people in this country in that respect."

Export Problem is Being Studied

Washington, Aug. 18.—Concrete results from the conferences last week between Secretary of the Treasury McAdoo and other government officials and financial and trade experts relating to the matter of relieving conditions growing out of the European war are expected to begin making their appearance tomorrow.

The standing committee of 12, headed by Seth Low, president of the National Civic Federation, will at that time receive reports from its sub-committees. The reports will deal with the three great questions taken up with the government officials, who have denoted their desire to co-operate with the business interests. These issues pertain to the restoration of the market for foreign exchange bills; immediate provision of means for transporting American grain, cotton and other merchandise abroad and war risk insurance.

President James A. Farrell, of the United States Steel Corporation, was made chairman of the sub-committee on transportation and will return to Washington to make the report of his sub-committee, according to arrangements. Mr. Farrell, President E. A. S. Clarke, of the Lackawanna Steel Co., and President John D. Ryan, of the Amalgamated Copper Co., were among the list of representatives of the National Foreign Trade Council who participated in the conferences. The entire delegation, comprised of 62 prominent men from all sections of the country, was addressed briefly by President Wilson, and expressed confidence that the President and other government officials and members of Congress were in closest sympathy with their plans.

Mr. Farrell said the matter of moving steel products now awaiting transportation was not taken up, the only matter discussed being that regarding wheat. Cotton and other products will be taken up this week. Then, it is considered, after ships have been secured to move these products for export and the government assumes the war risk insurance on American bottoms and cargoes, steel and other

(*Continued on page* 351.)

Problems of Capital and Labor

Ten Thousand Coal Miners at Work in Colorado—Employers State Fight is With United Mine Workers—"Check-Off" System

Denver, Aug. 17.—A bulletin issued by the committee on publicity of the Colorado coal mine managers consisting of J. F. Welborn, president, Colorado Fuel & Iron Co.; John C. Osgood, chairman, Victor-American Fuel Co., and D. W. Brown, president, Rocky Mountain Fuel Co., says in part:

"Ten thousand men are now faithfully at work in the Colorado coal mines. They are producing all the coal the market will absorb.

"To agree to the demands of those still nominally on strike would mean that these 10,000 men would of necessity be handed over bodily to the mercies of a labor union which they had never joined and which they had indicated no disposition to join.

"Surrender to the lawlessness and riot supported by the United Mine Workers of America would involve not only sacrifice of what the coal mine managers feel to be profoundly right, but would also mean betrayal of that daily increasing army of loyal employes, who in their silent fashion have manifested their preference to work in the 'open shop' promised to them at these mines—where any good workman is welcome.

"The fight of the Colorado coal mine managers is not against union labor.

"The principle of collective bargaining is not at stake.

"The struggle in Colorado is against the domination of a particular organization—the United Mine Workers of America.

"Opposition to the intrusion of this organization is due to the fact that but a small minority of the miners of Colorado are members of it, that its methods are intolerable, and that *its leaders have condoned, if not instigated, unnumbered acts designed to plunder property and to maim and kill loyal employes.*

"A peculiar feature of the United Mine Workers of America, one which distinguishes it from all other unions, is that in all mines where its regime is 'recognized' the operator must agree (*a*) that members of that union must receive first choice of all jobs, and (*b*) that before the men receive their wages, deduction must be made of whatever union dues or fines have been assessed, and the amount paid to that union. This is called the 'check-off.'

"The managers felt that submission to any such plan as that was unjustifiable in itself, and was an imposition upon their employes, who had a right to receive the whole of their wagese without interference by anyone. The earnings of the miners in the Colorado mines were the highest paid any coal miners in the United States.

"The 'check-off' means that all dues, fines, assessments and fees, which the organization sees fit to levy against its members, shall by the operator be deducted from the earnings of all workmen and remitted to the organization before any payments are made to the employes by the mining company.

"These checks frequently run high and dissatisfy the miners. No matter what their dissatisfaction, the deduction must be made just the same. Neither sickness nor unusual requirements or needs of a miner's family will permit the mine manager to take care of the miner's wants without first remitting to the organization the dues and assessments which may have been levied."

Tyranny of the "Check-Off"

The bulletin says that in speaking, on June 13, 1914, in the House of Represen tatives at Washington, Congressman Kindel, *himself a member of a labor union,* had this to say to the United Mine Workers of America:

"It has already been charged that the United Mine Workers of America is a criminal conspiracy under the Sherman anti-trust act. Its officers, and many of its leading members, are at this moment under indictment in the courts of several states.

"In 1912 the Socialist element in its ranks secured control of the organization, and its constitution was amended so as to proclaim that its members are entitled to absolutely all the profit derived from the business in which they are engaged to the exclusion of the man —the parasite as he is termed—who has invested his capital in a presumably legitimate business.

"But if these things were not so, *the demand for this so-called check-off,* the insistence of these leaders that an employer shall and must arbitrarily deduct from the pay roll of every employe, whether such employe desires it or not, an amount to be determined by others, *is so un-American and, in my opinion, so unlawful as to compel all fair-minded men to condemn any organization, be it a labor union or otherwise, which insists upon such a practice* as one of the cornerstones of its structure.

"There is no other labor organization in the world which depends upon this iniquitous practice for its existence. The check-off can be defended on no possible theory."

Plumber Pursued

Chicago, Aug. 17.—Chas. W. Dewey, Aurora, Ill., a plumber, has told Assistant District Attorney Albert L. Hopkins that business agents of plumbers' unions have pursued him ever since he has been in business, as he is a non-union man.

"They are taking my life's blood away from me," said Dewey. "I was a witness for the government when a number of plumbers were indicted in Des Moines, Ia., and since then they have been after me harder than ever." Dewey also complained of the Master Plumbers' Association, claiming they work hand in hand with the unions and he also claimed he could not buy goods from two of the principal plumbers' supply houses represented in this city.

In answer to a question whether these firms refused to sell him supplies Dewey said, "They use to but they won't any more. They say, 'Owing to the fact that you do not see your way clear to join the association, we cannot sell you anything.' "

Dewey claims that ever since this action had been taken he had been forced to buy his supplies in Toledo, Indianapolis and Milwaukee.

The alleged boycott, however, does not interfere with interstate commerce and because of this the government is unable to do anything for Mr. Dewey. The latter claimed he would carry the case to the state authorities.

Inquiry as to Apprentices

Milwaukee, Wis., Aug. 17.—An inquiry into the condition of Wisconsin apprentices with a view to determining what changes may be necessary to be made in the Wisconsin apprenticeship law of 1911 by the coming session of the legislature, has just been undertaken. The investigation is in charge of a committee of prominent manufacturers and representatives of labor unions, selected by the Industrial Commission of Wisconsin, consisting of the following:

A. T. Van Scoy, assistant secretary, International Harvester Co.; Frank J. Weber, business manager Federated

Problems of Capital and Labor

Wisconsin Apprentice System Under Investigation—Pennsylvania Plans to Inquire Into Immigrant Problem—Child Labor Bill

Trades Council; C. Edwin Search, Allis-Chalmers Mfg. Co.; George Mutter, business agent, machinists' union; William J. Fairbairn, secretary Milwaukee Metal Trades and Founders' Association; Fred H. French, business agent, patternmakers' union; William Kreening and Christian Scholtka, Nordberg Mfg. Co.

The committee has sent out a questionaire to every employer of juvenile labor in Wisconsin; to every labor union, and to 700 school principals and teachers. Answers are sought to the following questions:

1. Is it customary in your city for employers in your business or trade to take apprentices? If not, give the reason.
2. If they do not have apprentices, what arrangements do they make for teaching work to beginners?
3. How long does the term of apprenticeship, or the learning period, as the case may be, last?
4. What is the system of pay for learners and for apprentices?
5. Do you consider the present method of learning the trade or business satisfactory?
6. Do you think a system of indenturing apprentices is necessary or desirable in your business or trade?
7. Would you make the indenturing of apprentices compulsory? If not, what would you suggest as the best method of training beginners for your work?
8. What do you consider a proper ratio of apprentices to journeymen in your industry or trade?
9. Would you permit the apprenticing of some minors for specialized processes only, or would you require every apprentice to be taught the whole trade as carried on by the employer? What is the present practice?
10. Do you favor a bonus at the end of the term of apprenticeship, or would you suggest some other method of holding the apprentice to his contract?
11. Should those entering your business or trade have a specified amount of schooling? If so, how much?
12. Do you favor sending apprentices to a continuation or industrial school? Do you favor sending other minors over 16 to continuation schools during the learning period? If you do, how many hours a week for each?
13. Do you favor limiting the number of hours a day or week that minors may work? Would you permit overtime, and how much? Do you find the present apprentice law satisfactory?
14. How will the enforcement of section 1729s-8 (1-14) of the minimum wage act affect your industry or trade? If unfavorably, what would you suggest as a substitute?

The next legislature convenes in January, 1915, and the committee expects to be able to gather all of its material in time to present a comprehensive report to the industrial commission, which will go before the legislature with the largest assortment of data bearing on industrial relations and labor that has ever been collected by any one commission in the United States.

To Aid Immigrants

Harrisburg, Pa., Aug. 18.—Plans are now being outlined by the State Department of Labor and Industry for a study of the immigrant problem in Pennsylvania which it is believed will do much toward clarifying a situation about which there has been much ignorant writing and considerable reckless statement. Pennsylvania, which by the nature of its industries requires more raw labor than almost any other state, has been accused of failing to take care of the foreigners and of not facilitating their distribution. The act creating the department provided for the establishment of employment bureaus and investigations have been made, in co-operation with the United States government officials, in other countries and states. A plan for a state system will be evolved soon and the general assembly of 1915 will be asked for an appropriation to make it effective. Coincident with these studies the supply of foreign labor has been studied at first hand, the origin, port of entry, distribution, wages, age, social condition, attitude toward labor organizations and other details are being inquired into. The study has been under way in a quiet manner for several months and the conditions prevailing in the mills and mines of Pennsylvania through industrial conditions and the war have afforded especially favorable opportunities for getting at certain phases. It will take half a year to finish the studies outlined.

Housing conditions in Pennsylvania outside of the cities which have departments created for the purpose are to be brought under state control within a short time. The State Department of Health, which was charged with the duty of creating a bureau of housing by a recent act, is about ready to form its preliminary organization. The Legislature made no appropriation to carry the act into effect, it being the generally accepted belief that a skeleton organization was to be formed and the next general assembly informed of the cost. This nucleus will be effective before long. Under the terms of the act the bureau is charged with the duty of investigating sanitary conditions of tenement, lodging and boarding houses and "when the same are found, in the opinion of the bureau, to be a menace to those occupying the same, or employed therein, or to be overcrowded, to condemn the same, and to notify the owners or agents thereof in writing, setting forth the unsanitary or overcrowded conditions thereof and specifying in writing the changes or alterations which shall be made thereto." Copies of the requirements are to be filed in court and the owner or agent has 10 days in which to appeal, court review to be final. Stiff penalties for failure to comply or for refusal of entry to an agent of the state are provided. No similar act of recent years has such a wide scope.

More vocational educational courses, principally industrial, will be put into operation when Pennsylvania's schools open in September than ever before. State bureaus report a marked increase in manual training in industrial communities. Ten years ago such training was more or less experimental. Now it is part of the course in several hundred districts.

Drafts of standard regulations for the construction of ladders are being prepared by a committee of manufacturers, retailers, employers of labor, officials of labor organizations and state officials under auspices of the State Department of Labor. When the rules are promulgated manufacturers and all persons using ladders in industrial establishments will be required to have ladders of certain strength, the length being taken into consideration. The number of accidents reported through breaking of ladders caused this subject to be given attention.

Child Labor Bill

Washington, Aug. 18.—Amended by the committee on Labor, the Palmer child labor bill has been reported to the house. It makes unlawful interstate shipments of products of mines or quarries when produced either in whole or in part by children under 16 years of age, or products of manufacturing establishments when produced either in whole or in part by children under 14 years, and of products from such establishments when produced either in whole or in part by children between the ages of 14 and 16 years who work more than eight hours a day. It also confines their working hours between 7 o'clock in the morning and 7 o'clock in the evening.

Hope for Exports as War Rages

Chicago and Cleveland Exporters Will Seek Trade Abroad—Horse Shoes in Demand—Rates of New Panama Line

Chicago, Aug. 18.—Utter stagnation of foreign business, with information too vague on which to base a prophecy for future operations, sums up the situation as viewed by Chicago exporters.

The International Harvester Co., one of the largest exporters from this country, feels fortunate in that the war has come at the very beginning of the summer slack season, after shipments have been completed and before the movement of goods to Europe and South America has started for next season's selling. The next 90 days would see comparatively small volume of traffic from this company's American plants and for this reason its business is not yet interfered with seriously. However, it has goods held back in warehouses destined for Europe, South America, South Africa, Austria and Asia.

In addition to this being the dull season, the Harvester company feels it will be less interfered with by the war in Europe than many other exporters in that it has plants in France, England, Germany and Russia, from which a large portion of the machinery sold in this country is obtained. How seriously military operations will interfere with transporting its products from the factory to users, remains to be seen. One factor in this is the probability that each government will appreciate the necessity for harvesting its crops to feed the army and the population at home and this may furnish special facilities for transporting agricultural machinery which would not be available for other lines.

Should the war last more than three months, the situation will become more serious, as shipments for next season's sale must be started before the end of this year.

The American Radiator Co. is another large exporter doing considerable business in European countries and it also has factories in almost all of the warring countries. Its position is similar to that of the International Harvester Co. except that its product does not occupy the same relation to the government and may not be favored as much as agricultural machinery in the matter of shipments.

Both these concerns have been making as much of the foreign market as possible. The great majority of the agricultural implements sold in foreign countries are of American make and the biggest result of the war will not be to increase sales of this line of goods as much as to interfere with business already established, through lack of adequate transportation facilities.

Manufacturers who have not established themselves in foreign trade believe the opportunity ripe for capturing more or less of the markets in South America now catered to mostly by European countries. Every effort is being made along this line, believing the time is ripe to gain a foothold while European makers are kept from supplying their customers. Every effort is being made by a large number of manufacturers in the Chicago district to discover the proper methods and catalogs in Spanish are being prepared, salesmen are being sought and samples prepared, to provide for a campaign through South America.

The Imperial Brass Co., Chicago, is one of those preparing to invade this field. Frank MacMillas, secretary of this concern says:

"We have plans under advisement to take immediate advantage of the opportunities offered to American trade in South America. I have an appointment with a man who is in intimate touch with the conditions there and I expect some kind of a definite outline to follow our conference."

A. S. Shear, sales manager of the Chicago Belting Co., says:

"We are making a strong effort to rush our trade in the South American countries. We have a Spanish catalog under way and expect to follow these up with salesmen. Our permanent exhibition at Buenos Aires is a good starting point."

The American Wire Fabrics Co. is anxious to gain its share and C. K. Anderson, secretary-treasurer, feels that Germany, which has had the bulk of the South American trade, will find competition from the United States which will take a considerable slice. He believes adequate banking and shipping facilities will be necessary before we will be able to gain a strong foothold.

One result of the campaign for South American business will be the education of American manufacturers and exporters in the peculiarities of doing business with foreign dealers. Bureaus are being established already where information along this line may be obtained and societies having for their object increase for American exports are ready to answer questions and furnish information.

Gerrard P. Kiewenaar, vice president of the Export American Industries, believes the United States has the opportunity now to become the leading export nation. He believes the war situation will result to our very great advantage. The foreign bureaus of the Chicago Association of Commerce and Illinois Manufacturers' Association and the local office of the federal bureau of foreign and domestic commerce are doing everything possible to give information to inquirers.

Contraband Shipments

The Chamber of Commerce of the United States has arranged to be immediately advised of all announcements and regulations made by belligerants as to shipments of merchandise which may be held to be contraband of war.

All requests of the individual members for specific information will be answered promptly, by mail or telegraph, as circumstances call for, and the Chamber is prepared to co-oporate to the fullest extent to enable its members to secure information on this subject.

Hold Hopeful View

Cleveland, Aug. 18.—Cleveland manufacturers of iron and steel products and machinery for the export trade are at present experiencing some diminution of business on account of exports being held up, but they take a hopeful view of the situation and believe that ultimately they will enjoy a greatly increased business. As to the extent to which demand will come from South and Central America, definite opinions have not been formed, but it is believed that with the improved banking facilities now being arranged for by New York banks in the southern republics, it will be possible to carry on business much more satisfactorily than in past years, when the German banks controlled the situation almost entirely.

The Cleveland Foundry Co., which exports stoves, has been notified that

shipments cannot be made to foreign countries, but the export business of this company is not a large percentage of its business.

Foote, Burt & Co. and the Warner & Swasey Co., manufacturers of machine tools, have enjoyed considerable business with European countries which is now suspended. They expect, however, that there will be increased demand from South America and that in time European purchases will be resumed. These companies in past years have not been able to make many sales in South America.

The Cleveland Hardware Co. and the Eberhard Mfg. Co., manufacturers of hardware, state that their foreign business is so light that they have not felt any effects of the suspension of European commerce.

The White Sewing Machine Co., which has a large export business, shipped about $20,000 worth of sewing machines to New York shortly before war was declared by Great Britain. The machines were to have been forwarded to Australia, but shipments were held up and the company does not know what disposition will be made of them. The South American trade of this company is also held up, but it believes that if ships can be obtained, trade with South American countries could be largely increased.

The Oster Mfg. Co., manufacturer of tools, enjoys a large foreign trade. It had some orders from England and other countries on hand when war was declared, but all orders have been held up or cancelled, including shipments to South America. The company believes that the European war may arouse all Americans to an appreciation of the importance of establishing a merchant marine, and that if this can be done, trade with southern republics will be largely increased.

Demand for Horse Shoes

New York, Aug. 18.—Although foreign demand for American-made horseshoes has never been of any moment, it appears likely that the horseshoe export tonnage may be increased considerably in the immediate future as a result of the European war. One company reports having received large orders from abroad. This is the Burden Iron Co., of Troy, N. Y., which is to furnish large quantities of shoes for the cavalry horses of one of the belligerent powers. This company had expected to resume operations in its horseshoe plant some time in October, but as a result of this foreign business that department will resume in three weeks.

Most of the other large horseshoe manufacturers, however, report that they have not had any reason to believe that they may expect such business from abroad.

The question whether the exporting could be done, as horseshoes are contraband goods, is a serious one.

Opens Panama Line

New York, Aug. 18.—The steamship Mexican, of the American-Hawaiian Steamship Co., left New York for San Francisco on Aug. 15 inaugurating a new line between the Atlantic coast and the Pacific coast and Hawaii by way of the Panama canal. The company states it has a fleet of 26 vessels with a tonnage of 260,000 and that it expects to be able to make the trip from New York to lower California ports in 18 days. Eight of these steamships are newly-constructed. The inauguration of this line of boats is of considerable interest to the iron and steel industry in view of the re-opening of the Pacific coast market to domestic products through the elimination of the competition of foreign mills.

Prolongs Vacations

The Brown & Sharpe Mfg. Co., Providence, R. I., as a result of the stoppage of all exports owing to the European war, has decided to prolong the annual vacation of its employes to three weeks. According to present plans the works will reopen Aug. 24, instead of Aug. 17.

Reduced Rates by Panama Canal

A rate of 30 cents a ton on finished steel products from New York to San Francisco and other Pacific coast points through the Panama Canal has been put into effect by the steamship lines sailing this route. This rate compares with a range of 40 to 55 cents previously paid by way of the Tehuantepec route in Mexico or by the Strait of Magellan. It makes the rail and water rate from Pittsburgh by way of eastern ports 46 cents per ton compared with 66 cents by the former routes.

The Panama Canal was opened to commercial traffic Aug. 15 when the steamship Ancon passed through.

From Bad to Worse

Toronto, Aug. 18.—Since the outbreak of the war, conditions in the iron and steel industry have been steadily going from bad to worse. Many establishments are closing down and others greatly curtailing their output. The Massey-Harris Co., agricultural implement manufacturer, has closed down its plant at Brantford, Ont., where 1,000 men were employed and has notified the 2,500 employes of its Toronto plant that the works here will be closed Aug. 22, for the usual summer stock-taking, and that owing to unsettled conditions it is impossible to say when business will be resumed. The company's plant at Woodstock, Ont., will close when orders at present in hand are filled, which will probably be in about two weeks. Sir Lyman Jones, president of the company, states that a large number of orders for the European market were cancelled at the first sign of war. The Nova Scotia Steel & Coal Co. has curtailed the production of iron ore at Wabana, Newfoundland, and closed down the blast and open-hearth furnaces at Sydney Mines, N. S.

Reports from Youngstown indicate that leading mills in that center gradually are increasing operations. According to the *Youngstown Vindicator*, all departments of the Republic Iron & Steel Co., except the hoop and 20-inch bar mills will be in operation the week beginning Aug. 17. Operations at the works of the Carnegie Steel Co. will be slightly increased; the Youngstown Iron & Steel Co. will continue to operate at full capacity; the Youngstown Sheet & Tube Co. will run at about 80 per cent capacity, and the Brier Hill Steel Co. will increase operations slightly.

No. 1 blast furnace of the Shenango Furnace Co., Pittsburgh, at Sharpsville, Pa., is scheduled to resume operations the middle of this month, and it is probable the torch will be applied Aug. 17. The stack, which is practically a a duplicate of D furnace of the Youngstown Sheet & Tube Co., Youngstown, is one of the most modern in the Shenango valley, and will give the company a daily capacity of 1,050 tons of pig iron, being designed to produce 500 tons in 24 hours. No. 3 stack has a capacity of 350 tons and No. 4 furnace 200 tons.

The Crane Valve Co., Bridgeport, Conn., one of the largest manufacturers of valves and fittings in the east, is to be merged into the Crane Co., Chicago. The Crane Valve Co. was established under the laws of Connecticut about 15 years ago and pays taxes on an assessed valuation of $2,863,969.

J. S. Mundy, Newark, N. J., manufacturer of hoisting engines, who for some time has contemplated the erection of a new plant in that city, has taken out a permit for the erection of a one-story machine shop, coal bin and boiler room, to cost about $60,000.

Pig Output

For First Half of 1914 Smallest Since Last Half of 1911

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of all kinds of pig iron in the United States in the first six months of 1914. It was necessary to estimate the output of one furnace. Detailed statistics will be found in the accompanying tabulated statement.

Half Yearly Production of All Kinds of Pig Iron.

The production of all kinds of pig iron in the United States in the first half of 1914 amounted to 12,536,094 gross tons, against 14,477,550 tons in the last half of 1913, a decrease of 1,941,456 tons, or over 13.4 per cent. In the first half of 1913 the output was 16,488,602 tons. Comparing the output in the first half of 1914 with the output in the first half of 1913 shows a decrease of 3,952,508 tons, or over 23.9 per cent. A few thousand tons of ferro-phosphorus, ferro-titanium, ferro-vanadium and other ferro-alloys are included for each of the half years.

The maximum production of pig iron in any two half-yearly periods was reached in the 12 months from July 1, 1912, to June 30, 1913, when the output amounted to 32,143,265 tons. The next largest output was in the 12 months of 1913, when 30,966,152 tons were made. The output in the first six months of 1914 was the smallest in any half year since the last half of 1911.

On June 30, 1914, there were three furnaces in course of erection and 13 were being rebuilt. Of the building furnaces one was in Pennsylvania and two were in Minnesota. When completed, all will use coke for fuel. They will have a total annual capacity of 505,000 gross tons of pig iron. No new furnaces were built during the first half of 1914, but on June 30 a number of stacks were projected.

During the first half of 1914 there were five blast furnaces abandoned or dismantled, with a total annual capacity of 200,500 gross tons, as follows: New Jersey, one, with an annual capacity of 60,000 tons; Pennsylvania, two, with an annual capacity of 120,000 tons; Virginia, one, with an annual capacity of 2,500 tons, and Michigan, one, with an annual capacity of 18,000 tons. Some of these furnaces had been idle for many years.

The Link Belt Co., Thirty-ninth street and Stewart avenue, Chicago, has bought a block opposite its present plant, 550 x 598 feet, containing 328,900 square feet, for $95,000. The company announces the land is bought for probable future needs and is taken at this time because it is the only available property on which expansion could take place economically.

Year's Calendar

Announced by New England Foundrymen's Association

Announcement is made by the New England Foundrymen's Association of its calendar meetings for the fall and winter. The list of subjects that have been selected covers a variety of questions of important interest to the average foundryman and the speakers are among those well qualified in their respective fields.

The season's calendar is as follows:

Sept. 9 at Springfield, Mass.—"Heating With Waste Gases", by F. M. Parks.

Oct. 14 at Boston.—"Safety in Foundry Operations, or What Can the Employes do to Avoid Accidents", by M. W. Alexander.

Nov. 11 at Boston.—"Semi-Steel and Scientific Melting", by David McLain.

Dec. 9 at Boston.—"Autogenous Welding and Cutting by Means of the Oxy-acetylene Torch", by Henry Cave; illustrations and demonstrations will be given.

Jan. 13 at Boston.—Annual meeting of association.

Feb. 10 at Boston.—"Farm Efficiency", by L. G. Dodge, of the United States Department of Agriculture.

March 10 at Boston.—Address by representative of the National Red Cross Society.

April 14 at Boston.—"Molding Automobile Cylinders", by J. J. Wilson.

May 12.—Subject and place of meeting to be announced later.

June 9.—Subject and place of meeting to be announced later.

The officers of the New England Foundrymen's Association for the coming year are: President, Charles L. Nutter, Old Colony Foundry Co., East Bridgewater, Mass.; vice president, A. F. Corbin, Union Mfg. Co., New Britain, Conn.; treasurer, George H. Gibby, Gibby Foundry Co., East Boston, Mass.; secretary, Fred F. Stockwell, Barbour-Stockwell Co. Cambridge, Mass. Executive Committee.—Charles A. Reed, Reed, Fears & Miller, Boston; J. C. Hosford, Magee Furnace Co., Chelsea, Mass.; D. K. Bartlett, Builders' Iron Foundry Co., Providence; W. B. Leach, Hunt-Spiller Mfg. Co., Boston; L. J. Harley Jr., Harley Co., Springfield, Mass.

Better Volume

Of Steel Corporation Business — Unfilled Tonnage Report

For the United States Steel Corporation, July business was of considerably better volume than June, according to the monthly unfilled tonnage statement issued Aug. 10. In that period the total orders on hand increased 125,732 tons, which compares with a gain of 34,697 tons in June. The July increase was netted in the face of a heavier operating and shipping movement. The total orders on hand of the Steel Corporation July 31 were 4,158,589 tons, compared with 4,032,857 tons on June 30.

A statement of the unfilled tonnage of the Steel Corporation, showing the changes in tonnage and percentage by months, since the plan of announcing monthly the business on hand was adopted, follows:

Date.	Total.	Change, tonnage.	Change, per cent.
July 31, 1914....	4,158,589	125,732+	3.12+
June 30, 1914....	4,032,857	34,697+	0.86+
May 31, 1914....	3,998,160	278,908—	6.98—
Apr. 30, 1914....	4,277,068	376,757—	8.09—
Mar. 31, 1914....	4,653,825	372,615—	7.42—
Feb. 28, 1914....	5,026,440	412,760+	8.95+
Jan. 31, 1914....	4,613,680	331,572+	7.74+
Dec. 31, 1913....	4,282,108	114,239—	2.59—
Nov. 30, 1913....	4,396,347	117,420—	2.60—
Oct. 31, 1913....	4,513,767	490,018—	9.79—
Sep. 30, 1913....	5,003,785	219,683—	4.24—
Aug. 31, 1913....	5,223,468	175,888—	3.03—
July 31, 1913....	5,399,356	407,965—	7.03—
June 30, 1913....	5,807,317	517,005—	8.18—
May 31, 1913....	6,324,322	654,440—	9.38—
Apr. 30, 1913....	6,978,762	490,194—	6.55—
Mar. 31, 1913....	7,468,956	187,758—	2.45—
Feb. 28, 1913....	7,656,714	170,654—	2.18—
Jan. 31, 1913....	7,827,368	104,796—	1.32—
Dec. 31, 1912....	7,932,164	79,281+	1.01+
Nov. 30, 1912....	7,852,883	258,502+	3.40+
Oct. 31, 1912....	7,594,381	1,042,874+	15.33+
Sep. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206,296+	3.46+
July 31, 1912....	5,957,079	149,773+	2.58+
June 30, 1912....	5,807,346	56,363+	0.98+
May 31, 1912....	5,750,983	86,983+	1.52+
Apr. 30, 1912....	5,664,885	360,044+	6.97+
Mar. 31, 1912....	5,304,841	149,359—	2.79—
Feb. 29, 1912....	5,454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942,806+	23.24+
Nov. 30, 1911....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83,011+	2.25+
Sep. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3,695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3,361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228,597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289,624+	9.31+
Jan. 31, 1911....	3,110,919	436,163+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2,871,949	286,157—	9.12—
Sep. 30, 1910....	3,159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433,803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—

The Rogers Machine Co., Pittsburgh, has been incorporated with a capital of $10,000, by Ferdinand B. Rogers, Charles G. Rogers, Bertram B. Rogers, of Pittsburgh, and Claude C. Rogers, of McKees Rocks, Pa.

The rerolling mill of the Republic Iron & Steel Co., at Moline, Ill., was put in operation recently, after having been idle through the month of July.

PRODUCTION OF PIG IRON IN THE UNITED STATES IN THE FIRST SIX MONTHS OF 1914.

Statistics Collected from the Manufacturers by the Bureau of Statistics of The American Iron and Steel Institute, all in Gross Tons of 2,240 pounds.

Production in the First Half of 1913, 16,488,602 Gross Tons; Second Half of 1913, 14,477,550 Tons; First Half of 1914, 12,536,094 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States. Gross tons.	Blast Furnaces. In blast Dec. 31, 1913.	June 30, 1914. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1913.	Second half of 1913.	First half of 1914.
Massachusetts	1	0	2	2	8,581	4,229	4,292
Connecticut	1	1	2	3			
New York	12	13	15	28	1,193,450	994,170	818,425
New Jersey	2	2	4	6			
Pennsylvania	78	76	83	159	6,885,058	6,069,878	5,207,051
Maryland	1	2	3	5	152,002	137,957	101,605
Virginia	8	8	15	23	192,530	149,285	164,796
Georgia	0	0	4	4			
Texas	0	0	4	4			
Alabama	23	20	29	49	1,078,173	979,738	902,186
West Virginia	1	1	3	4			
Kentucky	1	1	7	8	165,000	150,731	136,742
Mississippi	0	0	1	1			
Tennessee	4	6	12	18	189,019	91,522	113,137
Ohio	40	43	32	75	3,660,473	3,469,052	2,865,367
Illinois	11	12	14	26	1,653,017	1,274,815	1,045,905
Indiana	5	8	2	10	894,743	881,140	851,700
Michigan	10	8	6	14			
Wisconsin	4	3	4	7	222,167	145,159	195,991
Minnesota	1	1	0	1			
Missouri	1	1	1	2			
Colorado	1	2	4	6			
Oregon	0	0	1	1	194,389	129,874	128,897
Washington	0	0	1	1			
California	0	0	0	0			
Total	205	208	249	457	16,488,602	14,477,550	12,536,094

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	12	13	10	23	1,193,450	994,170	818,425
New Jersey	2	2	4	6			
Pennsylvania	70	69	66	135	6,678,179	5,972,037	5,147,691
Maryland	1	2	2	4	152,002	137,957	101,605
Virginia	7	7	13	20	191,203	147,372	163,330
Georgia	0	0	2	2			
Texas	0	0	3	3			
Alabama	21	19	26	45	1,061,640	963,821	893,867
West Virginia	1	1	3	4	165,000	150,728	136,617
Kentucky	1	1	6	7			
Tennessee	4	6	11	17	188,574	89,632	113,137
Ohio	40	42	31	73	3,659,723	3,467,801	2,865,267
Illinois	11	12	14	26	1,653,017	1,274,815	1,045,905
Indiana	5	8	2	10	945,277	862,383	890,814
Michigan	3	1	2	3			
Wisconsin	3	3	3	6			
Minnesota	1	1	0	1			
Missouri	0	0	1	1			
Colorado	1	2	4	6	219,780	157,569	158,162
Washington	0	0	1	1			
California	0	0	0	0			
Total	183	189	204	393	*16,107,845	*14,218,285	*12,334,820

*Include small quantities of pig iron and ferro-alloys made with coke and electricity, etc.

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3	204,575	95,466	57,507
Pennsylvania	5	5	13	18			
Total	5	5	16	21	204,575	95,466	57,507

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	0	2	2	8,581	4,229	4,292
Connecticut	1	1	2	3			
New York	0	0	2	2			
Pennsylvania	3	2	4	6	2,304	2,375	1,853
Maryland	0	0	1	1	1,327	1,913	1,466
Virginia	1	1	2	3			
Alabama	2	1	3	4	16,533	15,917	8,319
Georgia	0	0	2	2			
Texas	0	0	1	1			
Kentucky	0	0	1	1	445	1,893	125
Tennessee	0	0	1	1			
Mississippi	0	0	1	1			
Ohio	0	1	1	2	750	1,251	100
Michigan	7	7	4	11	115,183	108,896	106,203
Wisconsin	1	0	1	1			
Missouri	1	1	0	1			
Oregon	0	0	1	1	31,059	27,325	21,409
California	0	0	0	0			
Total	17	14	29	43	* 176,182	* 163,799	* 143,767

*Include small quantities of pig iron and ferro-alloys made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	183	189	204	393	16,107,845	14,218,285	12,334,820
Anth.& anth.& coke	5	5	16	21	204,575	95,466	57,507
Charcoal	17	14	29	43	176,182	163,799	143,767
Total	205	208	249	457	16,488,602	14,477,550	12,536,094

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

	Districts. Gross tons.	Blast Furnaces. In blast Dec. 31, 1913.	June 30, 1914. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1913.	Second half of 1913.	First half of 1914.
Pennsylvania.	Lehigh Valley	9	8	13	21	580,591	473,095	421,491
	Schuylkill "	8	9	8	17	484,257	381,702	371,729
	L. Susq. "	6	4	11	15	372,781	262,298	197,841
	Juniata "	2	1	6	7	80,110	60,063	58,641
	Allegheny Co.	24	29	18	47	3,128,446	2,871,093	2,483,312
	Shenan. Valley	11	9	15	24	1,222,686	1,066,007	805,741
	Miscel. bitum.	15	14	8	22	1,013,883	953,245	866,443
	Charcoal	3	2	4	6	2,304	2,375	1,853
Ohio.	Mahoning Val.	11	17	8	25	1,512,690	1,475,280	1,239,588
	Hocking "	0	0	1	1			
	Lake Counties	12	11	6	17	1,142,044	1,085,493	898,900
	Miscel. bitum.	7	7	8	15	788,074	679,934	527,848
	H. R. bitum.	10	7	8	15	216,915	227,094	208,931
	H. R. charcoal	0	1	1	2	750	1,251	100

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	360,813	204,947	170,854
Pennsylvania	2,351,308	2,127,529	1,880,451
Maryland	152,002	137,957	101,605
West Virginia, Kentucky, and Tenn.	156,359	137,486	112,339
Ohio	2,263,949	1,920,153	1,551,795
Illinois, Wisconsin, Colorado, and California	1,001,535	776,075	561,054
Total	6,285,966	5,304,147	4,378,098

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.	Lehigh Valley	120,294	149,678	141,679
	Schuylkill Valley	70,420	42,399	44,003
	Lower Susquehanna Valley	1,314,068	1,165,177	1,055,600
	Allegheny County	846,526	770,275	639,169
	Shenango Valley	980,925	890,635	698,872
	Miscellaneous bituminous	707,533	564,338	479,845
Ohio.	Mahoning Valley	575,491	465,180	373,078
	Lake Counties			
	Hanging Rock bituminous			
	Miscellaneous bituminous			

PRODUCTION OF BASIC PIG IRON.

New York and New Jersey	264,661	299,691	153,112
Pennsylvania—Allegheny County	1,697,820	1,616,950	1,326,364
" Other counties	1,959,780	1,660,445	1,346,789
Virginia	463,539	367,649	295,283
Alabama			
Ohio	815,900	959,325	798,505
Indiana and Illinois	1,162,902	1,004,471	942,104
Michigan, Missouri, and Colorado	145,409	118,151	148,490
Total	6,510,011	6,026,682	5,010,647

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	111,243	118,590	86,154
Alabama			
Illinois			
Colorado			
Total	111,243	118,590	86,154

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1909 TO 1913.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.) 1909.	1910.	1911.	1912.	1913.
Massachusetts	18,388	16,582	9,649	17,366	12,810
Connecticut					
New York	1,733,675	1,938,407	1,562,756	1,939,231	2,187,620
New Jersey	294,474	264,781	40,663	36,876	
Pennsylvania	10,918,824	11,272,323	9,807,073	12,552,131	12,954,936
Maryland	286,856	326,214	255,816	219,546	289,959
Virginia	391,134	444,976	293,642	256,167	341,815
Georgia	26,072	14,725	1,200		
Texas					
Alabama	1,763,617	1,939,147	1,712,211	1,862,681	2,057,911
West Virginia	228,282	174,661	201,472	274,360	315,731
Kentucky	86,371	100,509	95,202	68,760	
Mississippi					
Tennessee	333,845	397,569	324,648	338,238	280,541
Ohio	5,551,545	5,752,112	5,310,506	6,802,493	7,129,525
Illinois	2,467,156	2,675,646	2,108,002	2,887,359	2,927,832
Indiana	964,289	1,250,103	1,163,932	1,770,628	1,775,883
Michigan					
Wisconsin	348,177	307,200	276,807	303,370	367,326
Minnesota					
Missouri					
Colorado	382,766	428,612	395,968	397,731	324,263
Washington					
California					
Total	25,795,471	27,303,567	23,649,547	29,726,937	30,966,152

Large Increase

In Production of Reinforcing Bars—Other Bar Statistics

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production in the United States in 1913 of all kinds of finished rolled forms of iron and steel. Detailed statistics of the output in 1913 of rails, structural shapes, wire rods, plates and sheets, black plates, or sheets, for tinning, tinplates and terne plates, wire nails and cut nails have already been published.

The production of iron and steel merchant bars in 1913 amounted to 3,957,609 tons, against 3,697,114 tons in 1912, an increase of 260,495 tons, or over 7 per cent. Of the total in 1913 about 1,026,632 tons were iron, against about 944,790 tons in 1912, a gain of 81,842 tons, and about 2,930,977 tons were steel, against about 2,752,324 tons in 1912, a gain of 178,653 tons. In the accompanying table the production of iron and steel merchant bars in 1913 is given separately by states. Horseshoe bars, bolt and nut rods, spike and chain rods, concrete bars, etc., are not included.

In 1913 the production of iron and steel bars for reinforced concrete work amounted to 319,670 tons, as compared with 274,332 tons in 1912, an increase of 45,338 tons, or over 16.5 per cent. Of the total in 1913 about 113 tons were iron, as compared with about 2,500 tons in 1912, and about 319,557 tons were steel, as compared with about 271,832 tons in 1912.

The production of spike rods, bolt rods, horseshoe bars, long angle splice bars, long tie-plate bars, hoops, bands, cotton-ties, strips, sheet piling, railroad ties, rolled axles, shafting, tires, steel wheels, scroll iron or steel, and other miscellaneous forms of finished rolled iron and steel is given in the accompanying table, iron products being separated from steel products. Rolled blooms, billets and axle blanks or billets for forging purposes are included, but forged armor plate, hammered axles and other forgings are not included. For 1912 and 1913 blooms, billets, sheet bars, tinplate bars and other semi-finished products rolled for export, as reported by the manufacturers, are included, but for 1911 and all prior years they are not included.

In 1913 the production of the miscellaneous rolled products above named amounted to 3,250,901 tons, as compared with 3,490,213 tons in 1912, a decrease of 239,312 tons, or over 6.8 per cent. Of the production in 1913 about 264,320 tons were iron and about 2,986,581 tons were steel, as compared with about 272,757 tons of iron and about 3,217,456 tons of steel in 1912.

States—Merchant bars.	Iron.	Steel.	Total.
Maine, Massachusetts, Rhode Island, & Conn.	32,166	37,066	69,232
New York	26,852	141,204	168,056
New Jersey and Maryland	27,039	36,443	63,482
Pennsylvania	386,883	1,543,229	1,930,112
Virginia, Ky., Tenn., N. C., Ga., and Texas	40,500	6,099	46,599
Alabama	2,200	45,086	47,286
Ohio	90,835	383,544	474,379
Indiana	218,021	319,864	537,885
Illinois	89,986	364,089	454,075
Michigan, Wisconsin, and Missouri	77,264	39,752	117,016
Colorado, Washington, and California	34,886	14,601	49,487
Total for 1913	1,026,632	2,930,977	3,957,609
Total for 1912	944,790	2,752,324	3,697,114
Total for 1911	835,625	2,211,737	3,047,362
Total for 1910	1,074,163	2,711,568	3,785,731
Total for 1909	952,230	2,311,301	3,263,531
Total for 1908	685,233	1,301,405	1,986,638
Total for 1907	1,440,356	2,530,632	3,970,988
Total for 1906	1,481,348	2,510,852	3,992,200
Total for 1905	1,322,439	2,271,162	3,593,601

PRODUCTION OF IRON AND STEEL MERCHANT BARS

Miscellaneous rolled products—Gross tons.	Iron.	Steel.	Total
Hoops	.....	280,886	280,886
Bands and cotton-ties	.....	499,660	499,660
Long angle splice bars, fish-plate bars, tie-plate bars, and other rail joint shapes	46,574	639,816	686,390
Sheet piling	.....	46,289	46,289
Railroad ties	.....	44,244	44,244
Spike and chain rods, bolt and nut rods, horseshoe bars, strips, etc.	217,343	850,101	1,067,444
Rolled forging blooms, billets, etc.	403	536,807	537,210
Blooms, billets, sheet bars, etc., for export	.....	88,778	88,778
Total for 1913	264,320	2,986,581	3,250,901
Total for 1912	272,757	3,217,456	3,490,213
Total for 1911	199,172	1,831,042	2,030,214
Total for 1910	207,003	2,413,713	2,620,716
Total for 1909	250,110	2,005,132	2,255,242
Total for 1908	183,649	990,738	1,174,387

PRODUCTION OF MISCELLANEOUS ROLLED PRODUCTS

The Graton & Knight Mfg. Co., Worcester, Mass., recently has established a branch at 301 Magazine street, New Orleans, La., and will carry in stock a complete line of leather belting, lace leather, belt dressing and cement. This branch is equipped to handle all kinds of repair work. The territory covered by the New Orleans branch includes the entire state of Louisiana and that portion of Mississippi south of Jackson and Meridian.

Will be Carried on by Walter Wood

The partnership heretofore existing between Walter Wood and Stuart Wood, trading as R. D. Wood & Co., Philadelphia, has been terminated by reason of the death of Stuart Wood on March 2, 1914. The business will be carried on by Walter Wood, under the name of R. D. Wood & Co. This company is over 110 years old and has had a prosperous career.

The American Flexible Bolt Co., Pittsburgh, has opened offices, 50 Church street, New York. R. W. Bennett, general sales manager, is in charge.

Export Problem is Being Studied

(*Continued from page 347.*)

commodities will soon find an easy outflow to markets abroad.

The meetings last week were executive, although Secretary McAdoo authorized a statement denoting the action taken.

Of utmost importance is the matter of persuading the government to assume war risks, and this was one of the proposals endorsed in a set of resolutions drawn up and adopted. Mr. Farrell, as chairman of the National Foreign Trade Council, acted as one of the organizers who presented the war risk resolution. The subcommittee which Mr. Farrell heads, dealing with the transportation problem, will report on amendments to the navigation laws to make a permanent American merchant marine for foreign trade. Both this and the question of establishing war insurance will require legislative action.

It was pointed out that "with enlarged registry of American ships and action by the government supplementing what private marine insurance companies might do in connection with insurance", the questions of exports and of foreign exchange would rapidly solve themselves.

Bills to be introduced in Congress to provide the remedies recommended will be drawn up as quickly as possible and pushed to enactment. The war risk insurance committee will draw up a measure providing for a government bureau, probably under the jurisdiction of the Department of Commerce, for the insurance against war risks of American register vessels. This bill will be purely an emergency measure, the government to receive premiums on any insurance it might write. Inasmuch as England, France, Belgium and other European countries have taken over war risks on their vessels, it was declared to be absolutely necessary that the United States take similar action. If it does not, it was stated, those countries can dictate entirely the prices at which products of this country for export may be sold.

The full committee has made recommendations that the Treasury Department deposit funds in leading financial and export centers for exclusive use in facilitating exports. It has also been recommended that the State Department secure the release of funds held in foreign countries from the sale of shipments diverted from their original destination or commandeered. The question of taking up the matter of establishing an international clearing house by the federal reserve board was also urged.

American Register for Foreign Bottoms

The Underwood bill granting American register to foreign-built ships that may be purchased by American citizens, or that are now owned by American corporations, for service in the foreign trade of the United States, passed Congress on Monday and was signed by President Wilson on Tuesday morning. The Panama Canal act of 1912 permitted the granting of American registry to foreign-built ships, not over five years old, for over-sea trade when purchased by American citizens and this bill simply strikes out the age limit. Under it any ship whatever may be purchased. The bill also, authorizes the president to suspend the provisions of the law requiring the watch officers to be citizens of the United States. This provision is essential as an emergency measure because there are not a sufficient number of licensed officers in the United States to man the ships.

Determined efforts were made in the Senate and in conference to extend coastwise privileges to the ships so admitted. In conference such a provision was actually inserted in the bill but it was defeated after a heated debate in the Senate. It is very surprising that such an amendment should have been attempted at all as it would literally wreck the ship building industry of the United States. The bill as passed is virtually the same as originally presented in the house and there is no special objection to it. Quite a number of American corporations now owning ships sailing under foreign flags will take advantage of it to transfer the ships to American register and thus facilitate our export trade which has been stagnant during the past 15 days. There are probably about 200 such ships that can be immediately transferred.

South America Wants to Buy

Washington, Aug. 18.—Telegrams are being received constantly by the Bureau of Foreign and Domestic Commerce, Department of Commerce, from Latin-American cities which are desirous of purchasing commodities. Included in the list are many iron and steel products, going to prove the possibilities of expanding the trade of United States makers in those fields. The European war has made the situation all the more favorable to this country and recognition of this fact has been given by the Department.

It has just announced that efforts will be made at once to bring this country and Latin-America into closer industrial relations and to this end it has arranged to send a number of experts in commercial lines as a traveling force to expand the trade of this country. Representatives of the steel and hardware trades will be included in the list. Names of these representatives will be made public soon. Already the Department has secured the services of Girard Harris, who is thoroughly acquainted with the South American conditions, This force will consist of men familiar with the language, customs and business methods of Latin-America, who have had practical experience in the lines of business carried on with Latin-America.

Of the list, four will be commercial attaches, for which provision has been made in the recently enacted legislative appropriation bill, calling for ten in all. Because of the war, some of them will not be sent abroad at this time, particularly those who will be named for service in European countries. Six commercial agents will be sent immediately to South America.

Among telegrams received by the Bureau of Foreign and Domestic commerce from merchants desirous of purchasing iron and steel commodities are those from the following cities:

Valparaiso: Different kinds of implement machinery, railway material, metallic items for domestic and building purposes.

Rosario: Enameled iron ware, galvanized wire, steel overwire, small motors, dynamos, electric supplies.

Buenos Aires: Pig iron, machinery, galvanized iron, automobiles, steel rails, railway material, wrought iron, structural iron, wire, electrical equipment, iron pipe, copper manufactures, bolts and nuts, tinplate, bridge materials. Each of these materials represents more than $1,000,000 annual importations.

Secures Order After Four Year Test

The Youngstown Sheet & Tube Co., Youngstown, O., has just closed a contract with the Ayer & Lord Tie Co., Chicago, for 2,000 square yards of creosoted wood block flooring for its shipping room at Youngstown. This order was obtained after a test lasting four years in which an experimental platform was laid, half of concrete and the other half of creosoted blocks. After four years' wear, which was practically equal on the two halves, it was found the concrete was worn down from ½ to 2 ½ inches below the original surface while the blocks showed practically no wear.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

In New York, the domestic machinery trade continues poor as a result of the war in Europe, buyers still refraining from closing until they have had more time to digest the present conditions. On the whole, however, the tone is a little better than last week and there are indications that a better volume of business will be placed before long. Nothing has been done on the Seaboard Air Line list, on which closing was held up two weeks ago as a direct result of the war. Neither has anything been done on the Lehigh Valley railroad's list. A new railroad list, which has been issued, is that of the Chesapeake & Ohio, which embraces specifications for some 25 machine tools. No assurance has been given as to when this will be closed. Some good business in cranes was closed during the week. The General Electric Co., which for a long time had been conspicuous by reason of its non-buying policy, has, it develops, closed recently for a few tools. The export machinery market continues entirely prostrated and there is practically no activity at the offices of the concerns engaged in the export business. These companies have no plans whatever for the future; they simply are waiting to see how the present situation will shape itself. They are resolved for the time being, even if boats are available, to ship no machinery whatever abroad, for the two-fold reason that marine insurance is prohibitive, and because there is no assurance that payments can be made from across the sea. Both importers and exporters continue to communicate with their continental branch houses or headquarters with great difficulty. Cables from France and England come through with a fair degree of regularity, but there are no direct means of communicating with Germany. It is possible to cable Germany, however, by way of Italy, while a few cables have been received from that country by way of Holland.

At Pittsburgh, the machine tool market has come to a standstill and no great change in the situation is expected until general conditions become more normal. Although there are no large exporters of machine tools at this center, the suspension of shipments abroad has indirectly affected the trade, causing considerable uncertainty and making it practically impossible for market observers to forecast the trend of developments the next few weeks. Prospects of extending the export field appear bright, but it will take time to work out satisfactory solutions of the complicated problem caused by the war abroad. The market for heavy rolling mill machinery and equipment is unchanged in position.

In Cincinnati, machine tool manufacturers do not expect a satisfactory development of the South American market because of the European war, and state that they have investigated this field many times without encouraging results. They also do not look for a very much larger domestic demand because very few tools are needed in this country at the present time, due to the low percentage of operation by a large number of users. Machinery business done in August will be far below that of any month this year unless sales increase during the last half of the month. Second-hand machinery is slow and discouraging.

EASTERN STATES

OLD TOWN, ME.—Old Town Canoe Co. will erect a 5-story, 250 x 300-foot addition to its factory.

ST. ALBANS, VT.—Sherman Bros.' lumber mill was destroyed by fire; loss, $50,000.

BOSTON. — Bostonia Motor Mfg. Co. has been incorporated; $200,000; by Henry L. Simons, Saul Weiss, David Flower.

HAVERHILL, MASS.—It is reported that Burgess-Laing, Boston, is considering a $250,000, 8-story cement factory for this city.

NORWALK, CONN.—H. Jacobs & Sons Co. considering plans for a $40,000 factory building.

NORWALK, CONN.—Alfred Scam, who conducts a brass furnishing factory under the name of S. Scam & Sons, is to build a new 34 x 80-foot factory.

NEWPORT, R. I.—Bureau of Yards and Docks, Washington, D. C., will receive bids until 11 a. m., Aug. 29, for corrugated siding and roofing for an addition to a bath house.

BROOKLYN.—Charles Wissman, 648 Lexington avenue, will erect a $200,000, 3-story, 57.9 x 91-foot, brick warehouse.

BUFFALO.—James Woolley Electric Co. has been incorporated; $50,000; J. Hora Jr., W. S. James, L. A. Woolley.

FULTON, N. Y.—Oswego capital is understood to have secured control of the water rights of the lower dam on the Oswego river and plans are on foot to build a large hyro-electric plant.

GLOVERSVILLE, N. Y.—J. M. Peters' Sons Lumber Co., Bleecker, N. Y., has purchased a site and will erect a 1-story, 40 x 100-foot factory for the manufacture of wood turnings, etc.

GLOVERSVILLE, N. Y.—E. S. Parkhurst & Co.'s plant, recently destroyed by fire, will be rebuilt at once.

HUDSON, N. Y.—Building on the mill property at Tivoli is being torn down; C. H. Feroe expects to erect a factory building on the site shortly; M. A. Bennett will move his shirt factory there upon its completion.

KINGSTON, N. Y.—Wemlinger Steel Piling Co., 11 Broadway, New York, N. Y., is planning a 1-story, 50 x 120-foot manufacturing plant for this city.

NEW HARTFORD, N. Y.—C. O. Podley, town clerk, will receive bids until 2 p. m., Aug. 24, for a steel and concrete bridge over Sanquoit Creek.

NEW WINDSOR, N. Y.—Turl Iron & Car Co., car builders, has been incorporated; $100,000; by C. E. Stafford, W. Dyke, Newburgh, N. Y.

NEW YORK. — American Gas Governor Works has been incorporated; $6,000; by Charles Hoelscher, Theresa and J. F. Sperber, 172 West Ninety-fifth street.

NEW YORK.—Alumina Mfg. Co., kitchen utensils, has been incorporated; $50,000; by Charlotte Winnett, M. G., and L. G. Goetz, 102 East Forty-fourth street.

NEW YORK.—Sugar Factories Construction & Equipment Co. has been incorporated; $7,000; by J. Stephen Hugham, C. J. Turck, H. C. Larkin, Scarsdale, Pa.

NEW YORK.—Sanitary Scrubbing Machine corporation has received its charter; $10,000; F. A. Bunn, J. C. Sealy, W. J. Osborne, 17 State street, incorporators.

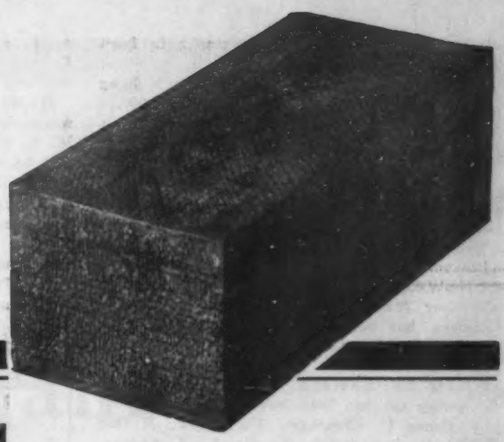
NEW YORK.—North American Vending Co., slot machines, has been incorporated; $150,000; by F. Jefferson, W. L. O'Connor, W. J. Smith, 223 Fifty-fourth street, Brooklyn.

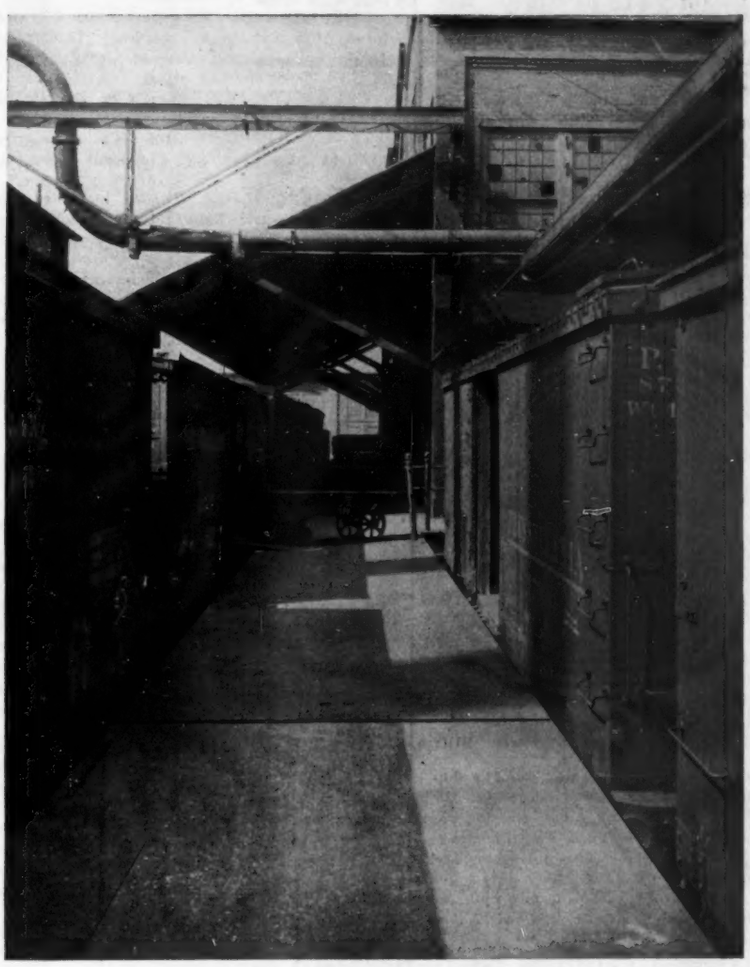
SYRACUSE, N. Y.—E. R. Cadwell & Sons Brass Co. has awarded the contract for a brick and steel machine shop and foundry on West Layette street.

MEADVILLE, PA.—Negotiations are pending for the location of a big steel car works north of Shenango near the Bessemer & Lake Erie, and the Pennsylvania railway; it will manufacture steel passenger coaches, steel street cars, and other steel vehicles.

PHILADELPHIA. — Fire destroyed the Pennsylvania Machine Mfg. Co.'s pattern shop;

You can't dodge this Proof!





This illustration shows a loading platform. The part of the flooring above the line is **Ayer & Lord Creosoted Wood Blocks.** The part below the line is **concrete.**

The owners of this platform wished to satisfy themselves in their own way, just what the relative services of these two floorings really amounted to; consequently this side by side experiment was tried out.

TODAY, after undergoing **four years** of hard service, during which from 250 to 300 tons were daily trucked across it, the concrete part of this platform is thickly spotted with holes ranging from ¼" to 2" deep.

The **Ayer & Lord Creosoted Wood Block** part does not show the least sign of wear!

Actual experience is teaching this same fact to concerns throughout the whole country!

Ayer & Lord's Interior Wood Blocks, due to their dryness, form the most **healthful** flooring that could be installed. They are the easiest on the workmen's feet. They will not disintegrate. They reduce noise to a minimum. They positively make the best working surface procurable.

Success follows "Ayer & Lord's" Interior Wood Blocks

Write today for our free booklet **"FLOORS"**

Ayer & Lord Tie Company

General Office: Railway Exchange, Chicago

CLEVELAND, O.—801 Swetland Bldg. ST. LOUIS, MO.—554 Pierce Bldg.
KANSAS CITY, MO.—1117 Rialto Bldg. MEMPHIS, TENN.—1402 Exchange Bldg.
PHILADELPHIA, PA.—319 Perry Bldg.

AYER & LORD
INTERIOR
Always Easy on the Feet
WOOD BLOCKS

it was a brick building, two stories in front and three in the rear.

PITTSBURGH. — National Metal Molding Co. has increased its debt limit to $500,000.

BAYONNE, N. J.—Star Lighting Fixture Co. has been incorporated; $30,000; by Joseph Ribak, Hyman Goldberg, New York; Jacob Brawn, Newark, N. J.; Louis Brawn.

BRIDGETON, N. J.—Merit Hosiery Mills has been incorporated; $50,000; by James W. Trenchard, Richard R. Miller, Edward P. Beacon.

NEWARK, N. J. — American Automatic Vending Machine Co., manufacture automatic devices, has been incorporated; $300,000; by Arthur D. Loverin, William S. Harrington, et al.

NEW BRUNSWICK, N. J.—Brunswick Engineering Co. has been incorporated; $125,000; by James L. Cheatham, Thomas F. McCormick, Bradley Beach, N. J.; A. B. Choyce, Newark, N. J.

ORANGE, N. J.—New Jersey Foundry Co., textile machinery, has been incorporated; $10,000; by Mary Vigil, Vito A. Serritella, Brooklyn, N. Y.; Vito Sangracono, Newark.

BALTIMORE, MD.—Dix Mfg. Co. will erect a 2-story, reinforced concrete factory and warehouse building; it will be triangular; frontage, 120 feet; depth, 126 feet; cost, about $25,000.

FREDERICK, MD.—Hagerstown & Frederick Electric railway has purchased the Frostburg Illuminating & Mfg. Co.; this is the first step toward the construction of an electric railway to connect Johnstown, Frostburg, Cumberland and Hagerstown.

CENTRAL STATES

AKRON, O.—E. B. Gill Mfg. Co., has been incorporated; $10,000; E. B. Gill, R. A. McConnell, J. Blackmore, F. B. Carpenter, C. F. Schnee.

AKRON, O.—G. M. Ott, head of a new $100,000 rubber company, says that unless the city council grants right of way on the city land east of Elizabeth park, near which his company owns nine acres, the factory will be located in Cleveland.

CINCINNATI.—J. A. Fay & Egan Co. has acquired the foundry of the Mowery Car Wheel Co.; the new owners will fit up the plant and operate it.

CINCINNATI, O.—Universal Tape Moistener Machine Co., manufacturer, has been incorporated; $5,000; by Louis B. Sawyer, Adeline Rees, Sam Becker, William A. Roudebush, J. W. Wolfe.

CLEVELAND. — Mechanical Development Co. has been incorporated; $10,000; by W. H. Hasselman, Carl E. Mueller, C. A. Coby, W. G. Radcliffe, L. Schwartzenberg.

CLEVELAND.—Automatic Lifting Jack Co. has been incorporated; $50,000; by T. H. Wittliff, C. W. Parker, C. M. Deadwyler, F. M. Wittliff, J. A. Wortman.

CLEVELAND.—Earnest McGeorge, architect and engineer, will have plans ready within ten days for a $30,000, 2-story, 80 x 170-foot, steel and brick factory building for the Warren Refining Co.; factory will be at Meech avenue and East Ninety-third street.

CLYDE, O.—Shelder-Excel Mfg. Co. has been incorporated; $5,000; by E. L. Field, W. Anthony, Mrs. W. Steinbronner, et al.

COLUMBUS, O.—Bigsby-Rotary Mfg. Co., machinery, has been incorporated; $100,000; by W. A. Christopher, H. C. Robblee, H. R. Pahler, V. L. Collister, C. E. Bushhold.

DAYTON, O.—City Engineer Cummin has sent plans for the Steward street canal bridge to Columbus; when approved, bids will be advertised immediately.

DENNISON, O.—Ground has been broken for the erection of the Ross Clay Co.'s plant; buildings and kilns will be completed by Jan. 1.

FINDLAY, O.—J. C. Copeland, clerk of county commissioners, will open bids Aug. 29 for the Vine street bridge in Fostoria; certified check, $100, required.

HAMILTON, O.—Sterling Paper Co. will reorganize as the Hamilton Paper Mills Co.; M. C. Stern, Dayton, O., says that $100,000 will be spent on machinery and buildings.

HAMILTON, O.—Eugene Purtelle, Tipton, Ind., president of the proposed Richmond & Hamilton Traction line, says that the company is now sufficiently financed to proceed with the construction.

KENT, O.—Kent Engineering & Supply Co. has been incorporated; $20,000; by F. D. Nelson, R. T. Bailey, Helen Bailey, W. W. Reed, J. A. Rhodes.

LOVELAND, O.—Loveland Light & Water Co. has been incorporated; $50,000; by J. A. Bechtel, Stanley Matthews, A. W. Jones, F. C. Fabel, C. A. Gordon.

MARTINS FERRY, O.—Ground has been broken for the Wheeling Traction Co.'s $260,000, reinforced concrete, and brick power plant.

MIDDLEFIELD, O.—Middlefield Telephone Co. has been incorporated; $10,000; by J. E. Johnson, F. N. Griffin, D. C. Chubb et al.

NILES, O.—Ohio Galvanizing & Mfg. Co. has awarded contracts for a 35,000 square foot addition to its plant.

STEUBENVILLE, O.—H. D. Hershey, Irwin, Pa., backed by financial men in his home city, has submitted a proposition to the city council to establish an additional electric lighting plant here.

YORKVILLE, O.—Wheeling Steel & Iron Co. plans several additional mills for its 10-mill plant here; to be erected within the next year.

YOUNGSTOWN, O.—Distilled Water Ice Co. will double its 5-ton plant; plans are prepared.

YOUNGSTOWN, O.—Youngstown Iron & Steel Co. has awarded contracts to the Fort Pitt Bridge Co., Pittsburgh, contracts for the steel for the eopen hearth plant at Lowelville, also for steel structures for the bloomiing mill, billet mill and sheet bar mill.

CHARLESTON, W. VA.—Vulcan Foundry & Machine Co. was destroyed by fire; $50,000, partially covered by insurance.

BURKESVILLE, KY.—Burkesville Light & Power Co. has been organized; $2,000; by J. P. Smith, George Greenup et al., it will install a small lighting plant.

CAVE CITY, KY.—Cave City Ice Co. is planning to put in an electric light plant.

DIXON, KY.—Dixon Motor Co. is reported to have plans for the equipment of repair shop.

HENDERSON, KY.—Boiler house of the municipal electric light plant, recently damaged by a cyclone; loss, $10,000; will be rebuilt at once.

LOUISVILLE.—J. Schwarzwalder Co., beer keg concern, has taken out a permit for a factory building; electric power will be used; address A. G. Herb.

LOUISVILLE.—Henry Freuchtenicht, grain dealer, has begun the erection of an elevator at Seventh street and Mix avenue, and will purchase a 20-horsepower motor, conveying equipment, etc.

LOUISVILLE.—Louisville Sand & Gravel Co. has been incorporated; $7,500; and will purchase digging equipment, which will be operated with two motors, 20 and 50-horsepower; M. M. Renn, manager.

LOUISVILLE.—Kentucky Cotton Yarn Co. is being organized with $200,000 capital stock to manufacture waste products; a mill building at Baxter avenue and Hamilton street will be leased and equipped with electric power to the amount of 400-horsepower, special machines for manufacturing mop yarns, wicking, etc., will also be needed; Ira F. Phillips, general manager.

TAYLORVILLE, KY.—Polk Bros., tobacco company, has purchased a site in Shelbyville, Ky., to which its factory will be moved; much new equipment will be needed.

GREENBURG, IND.—L. W. Sands, county auditor, will open bids Sept. 7 for the construction and repair of the Emmert bridge, Washington township; Ramer bridge, Adams township; Star Church bridge, Adams township; Turner's Corner bridge, Clay township; Fall-Fork bridge, Meyer's road, Clay township; Delger Moore bridge, Jackson township; McConnell bridge, Marion township; bids will be taken separately for each bridge; plans filed with auditor.

INDIANAPOLIS, IND. — The National Motor Vehicle Co. has increased its capital from $250,000 to $600,000.

INDIANAPOLIS, IND.—Community Ice Co. has been incorporated; $125,000; by Carl D. Spencer, Harvey B. Stout Jr., William G. S. Heridor.

INDIANAPOLIS, IND.—Indiana state normal board has accepted the plans for the $200,000 vocational education building at Terre Haute; it will be of brick and stone, three stories, and will be 132 x 148 feet; it will contain a manual training department and a drop forge plant.

LA PORTE, IND.—Chamber of commerce has closed a deal by which this city is to receive a new industry, the character of which remains a secret; plans have been completed

The Machinery News In Miniature

BELOW will be found the most important new business items of the week boiled down for the busy reader. They are culled from a great mass of less important information for your benefit. Even if your time is limited, look over this list every week.

National Steel Car Co. may extend its passenger car plant at Hamilton, Ont.

Old Town Canoe Co. will erect a 5-story, 250 x 300-foot addition to its factory at Old Town, Me.

M. C. Stern, Dayton, O., says $100,000 *will be spent on machinery and buildings by the Sterling Paper Co., of Hamilton, Ohio.*

Youngstown Iron & Steel Co. has awarded contracts to the Fort Pitt Bridge Co. for steel work for its new open-hearth plant, blooming mill, billet mill, and sheet bar mill.

Port commission, Jacksonville, Fla., will receive bids until Sept. 10 *for sheet steel piling for a municipal dock.*

W. F. McClure, state engineer, Sacramento, Cal., will receive bids until noon, Sept. 3, *for furnishing* 240,000 *automobile number plates.*

Jones & Laughlin Steel Co. will add ten mills to its plant at New Castle, Pa.

Wheeling Steel & Iron Co. is planning several additions to its plant at Yorkville, O.

Southern Power Co. will build a $1,000,000 *steam turbine plant to Raleigh, N. C.*

Kentucky Cotton Yarn Co., Louisville, Ky., will be in the market for motors aggregating 400-*horsepower.*

Ford Motor Co., Detroit, will build an addition to its service and assembling plant at Minneapolis.

Chesapeake & Ohio railway is in the market for about 25 *machine tools.*

Ferro-Manganese

There is no question that the supply of Ferro Manganese will be very short, if it is not entirely cut off, for some time to come.

Every steel maker knows that in adding Ferro-Manganese to steel to secure a content of manganese there is a loss of 20% or more of manganese by oxidation.

To conserve your manganese supply we suggest the use of the more efficient deoxidizer Ferro Carbon Titanium for this preliminary deoxidation—under normal conditions this practice would be too expensive but at present it will prove economical. Make your manganese supply go from 25% to 40% farther.

TITANIUM ALLOY MFG. CO.

Operating Under Rossi Patents
Processes and Products Patented

General Offices and Works—Niagara Falls, N. Y.
Pittsburgh Office—Oliver Building
Chicago Office—Peoples Gas Building
New York Office—15 Wall Street

Agents Great Britain and Europe—T. Rowlands & Co., Sheffield, England

and the factory will be located upon a 4-acre site.

MUNCIE, IND.—Blue prints for the plan for lengthening and raising the C. & O. railway bridge over White river have been sent to City Engineer Deardorff and upon his approval the contract will be let immediately.

NEW CASTLE, IND.—Jones & Laughlin Steel Co. will add eight tin mills to its plant here; they are expected to be in operation by the end of the summer.

PLYMOUTH, IND.—Municipal Sanitary Devices Co., machinery and tools, has been incorporated; $50,000; by Charles L. Talbert, Charles W. Pyne, Robert H. Grotefeld, et al.

BELVIDERE, ILL.—Parsons Casket Hardware Co. has been incorporated; $25,000; M. C. Parsons, Paul L. Parsons, Owen Roberts.

BLOOMINGTON, ILL.—C. W. Klemm has received a permit for a $23,750, 5-story factory building.

SPRINGFIELD, ILL.—Ross P. Beckstrom Co., construction, has been incorporated; $10,000; by Ross P. Beckstrom, A. C. Winstom, Frank Hoelscher.

BAY CITY, MICH.—North American Construction Co., makers of aladdin houses, will soon commence the erection of a factory here; O. E. Soverign says that the first of the new buildings will contain 100,000 square feet and will be 125 x 750 feet.

HILLSDALE, MICH.—Business men will confer with the Toledo & Western officials to ascertain if they would equip and operate the proposed electric line between here and Pioneer or Alvordton, O., if the business men would see to the grading and laying of rails.

WELLS, MICH.—A large pulp box factory is to be constructed here by Milwaukee capitalists.

APPLETON, WIS.—Killan-Strait Mfg. Co. was damaged by fire; loss, $1,000.

MARSHFIELD, WIS.—Felker Co. plans a new building for its galvanized iron products factory; work will begin this fall.

MILWAUKEE.—Charlton-Kuenzli Co. is erecting a $5,000 factory building for the Michigan Quartz & Silica Co.

ROCKTON, WIS.—Rockton council will vacate 160 feet of Cottage street to allow the Great Northern Mfg. Co. to build its factory there; it will manufacture a new auto wheel without pneumatic tires.

KANSAS CITY, MO.—C. M. Beachey et al., Wichita, Kas., have organized the Apline Ice Co. to erect an $85,000 fireproof plant in North Kansas City, to have daily capacity of 50 tons; plans by McCandish Engineering Co., Kansas City.

ST. LOUIS.—Alta Gas Generator Co. has been incorporated; $200,000; Michael Harris, William Sacks, Joseph A. Marre.

ST. LOUIS.—Emerson Electric Co., now at Twenty-first street and Washington avenue, has leased the fifth and sixth floors of the Elias Haas building, now being constructed; each floor has 15,000 square feet.

DUBUQUE, IA.—Mathis-Metz Printing Co. was damaged by fire; loss, $10,000; chief damage was done to stock and machinery.

MINNEAPOLIS.—Ford Motor Co. has purchased two lots preparatory to building an addition to its branch factory now under construction.

MINNEAPOLIS.—Architects Schnetzky & Son will soon receive bids for the Chicago, Racine & Milwaukee Railway Co.'s $100,000, 112 x 300-foot, brick, concrete and steel warehouse to be erected here.

ST. PAUL.—A. G. Erickson will rebuild a 3-story brick factory and warehouse for Jones Bros.; cost, $10,000.

SOUTHERN STATES

CLIFTON FORGE, VA.—Virginia Western Power Co. expects to erect, within the next few months, 50 miles of transmission lines and several sub-stations.

OAK RIDGE, N. C.—It is reported that the Oak Ridge institute is considering a power plant to furnish electricity for the institution and also for the town.

RALEIGH, N. C.—Southern Power Co. has secured options on land near their present sub-station, which will be used for the establishment of a steam turbine plant; cost, about $1,000,000.

FLORENCE, S. C.—It is reported that the Florence Electric & Utility Co. will double its capacity for furnishing light and power; F. G. Godfrey, superintendent.

PELHAM, GA.—Cairo, Pelham & Moultrie Railway Co. has been incorporated; $75,000; to build a 50-mile railway from Pelham to Moultrie; incorporators; J. J. Hill, D. Turner, et al.

JACKSONVILLE, FLA.—Port Commission will receive bids until noon, Sept. 10, for constructing interlocking steel sheet piling bulkheads for municipal dock and terminal purposes.

VICKSBURG, MISS.—A. M. Taxton, city clerk, will receive bids until 5 p. m., Sept. 21, for equipment and material for building water works system and filters; A. H. Dabney, engineer, Memphis, Tenn.

JONESVILLE, LA.—Louisiana & Arkansas Railway Co. has secured a site here and will erect a repair shop; F. W. Green, general manager, Stamps, Ark.

DENTON, TEX.—Tarrent Traction Co. has applied to the city council for the franchise for its proposed interurban railway in that city; a line will be constructed between Fort Worth and Denton.

LA PORTE, TEX.—La Porte Water, Light & Ice Co. expects to purchase, within the next few months, one 15-ton ice plant, two 75-horsepower crude-oil engines, and to erect three miles of transmission lines, two 50,000-gallon water towers and tanks, and install water mains, etc.

BUNTYN, TENN.—Southern Railway, general offices, Washington, D. C., will equip a power house and a machine shop here; building operations just started.

JACKSON, TENN.—Beare Bros. Ice & Coal Co. will make improvements and extensions in its ice plants here; a machine, 110-ton capacity, will be installed.

JOHNSON CITY, TENN.—Harris Mfg. Co. will be in the market shortly for equipment for a 30-ton ice factory; work on the building has begun.

NASHVILLE, TENN.—Cumberland Tobacco Works was damaged by fire; loss, $50,000; rebuilding will start shortly; address J. F. Regan.

NASHVILLE, TENN.—Moseley Cooperage Co. was damaged by fire; loss, $10,000; burned equipment will be replaced; M. T. Moseley, manager.

WESTERN STATES

CENTER, N. D.—F. J. V. Kiebert, county auditor, will receive bids until 3 p. m., Aug. 21, for an 80-foot low truss Iowa bridge.

LEXINGTON, NEB.—County clerk will receive bids until noon, Sept. 11, for a bridge over Platte river, to be either concrete or girder type of 25 34-foot spans, concrete arch of 16 50-foot spans.

BONNER SPRINGS, KAS.—Kansas City, Kaw Valley & Western Railway Co. plans to begin work at once on an extension from Bonner Springs to Lawrence.

LAWRENCE, KAS.—City will soon vote on $350,000 bonds for a new water works or to purchase the private plant and make improvements.

OGDEN CITY, UTAH.—Utah Cereal Food Co. is planning a factory for this city; M. S. Browning, president, says that bids for the building and machinery will be received shortly.

SALT LAKE CITY.—Murray Laundry Co. will erect a $20,000 plant in Murray, Utah, shortly.

GRESHAM, ORE.—Several sites for the proposed co-operative cannery to be built by the Gresham Fruitgrowers' Association are listed with H. J. Sterling, field agent.

CHICO, CAL.—A paper mill will be established along the Feather river at or near Blairsden; investment, about $1,218,800.

LOS ANGELES, CAL. — Union Salt Co. will erect a salt refinery here; Maynard Gunsul, president.

LOS ANGELES, CAL.—Rudgear-Merle Co., San Francisco, has plans for its 3-story, 100 x 300-foot warehouse and factory to be built at Alameda and Palmetto streets.

LOS ANGELES.—Pioneer Paper Co. has let the contract for its $6,700, 2-story, 80 x 140-foot, corrugated iron, frame, concrete warehouse to the Davidson Construction Co.

SACRAMENTO, CAL.—W. F. McClure, state engineer, will receive bids until noon, Sept. 3, for furnishing 120,000 pairs of automobile plates, etc.

SAN BERNARDINO, CAL.—San Bernardino Ice Co. recently incorporated; $50,000; will erect an ice plant; O. V. Hanstead, is one of the directors.

SAN FRANCISCO. — Dnamond Show Case Co.'s factory was destroyed by fire; loss, $6,000.

WEAVERVILLE, CAL.—E. E. Harrigan will erect a 60-ton crushing plant at his mines here.

CANADA

NORTH VANCOUVER, B. C.—Bids for the remainder of the Dominion Ship Building & Drydock Co.'s plant will be received until Sept. 1; machinery will be awarded about Oct. 1; Thomas Fry, financial manager.

WINNIPEG, MAN.—American Wells Co., Chicago, Ill., manufacturer of well supplies, plan a branch factory for this city, for the manufacture of well-drilling machinery; M. T. Chapman, president.

HAMILTON, ONT. — National Steel Car Co. is reported to be planning an extension to its passenger car plant.

OTTAWA, ONT. — Watson Carriage Co., recently damaged by fire; loss, $40,000; will rebuild at once.

TORONTO, ONT.—Pollay Aeroplane Co., Belleville, Ont., has purchased a site and will build a 2-story, 50 x 180-foot, brick factory.

SWIFT CURRENT, SASK.—Town has issued $196,000 improvement bonds; $60,000 will be used for a municipal light plant.

TRADE NOTES

JOSEPHINE, PA.—The Bollinger-Andrews Co., Pittsburgh, has started to build its new ingot mold plant at this center, and all necessary foundry equipment and cranes have been purchased. The foundry will receive metal direct from the blast furnace plant of Corrigan, McKinney & Co., Cleveland. The Bollinger-Andrews plant at Verona, Pa., will be used for structural work.

PITTSBURGH.—The Standard Bridge Tool Co., Bessemer building, has received orders for two Thomas spacing tables in connection with punches furnished by the Hilles & Jones Co., Wilmington, Del., to be installed in works of the Standard Steel Car Co., at Butler, Pa. and Hammond, Ind. A combination punch and spacing table, similar to those involved in this order, was illustrated and described on page 256 of the Aug. 6 issue of THE IRON TRADE REVIEW. The Standard Bridge Tool Co. also has received orders for a hand operated spacing table for the Mt. Vernon Car Co., Mt. Vernon, Ill., and an order for a punching table for the Pittsburgh Bridge & Iron Works, Rochester, Pa.

ROGERS, BROWN & CO. want to have every pound of PIG IRON you melt of the highest efficiency and value to you. Our knowledge of PIG IRON Manufacture and Values for thirty-four years is worth something. You may have the advantage of it for the asking.

Rogers, Brown & Company

CINCINNATI NEW YORK BUFFALO
CHICAGO PITTSBURG CLEVELAND
PHILADELPHIA BOSTON ST. LOUIS

PIG IRON COKE FERRO MANGANESE FLUOR SPAR

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery Through Third Quarter.)

Bessemer, valley	$14.00
Bessemer, Pittsburgh	14.90
Basic, Pittsburgh	13.90
Basic, eastern Pa.	14.00 to 14.25
Malleable, Pittsburgh	13.90 to 14.40
Malleable, Chicago	14.00
Malleable, Philadelphia	16.00 to 16.50
Malleable, Buffalo	13.00 to 14.00
No. 1X Philadelphia	15.00 to 15.25
No. 2 foundry, Pittsburgh	13.90 to 14.40
No. 2 foundry, Cleveland	13.75 to 14.25
No. 2 foundry, Ironton	13.50
No. 2 foundry, Chicago	14.00
No. 2X foundry, Philadelphia	14.75 to 15.00
No. 2X fdry., (N. J. tidewater)	14.25 to 14.75
No. 2X foundry, Buffalo	12.75 to 14.00
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, (N. J. tidewater)	14.00 to 14.25
No. 2 plain, Buffalo	12.50 to 13.50
No. 2 southern, Birmingham	10.00 to 10.50
No. 2 southern, Cincinnati	13.25 to 13.75
No. 2 southern, Chicago	14.85 to 15.85
No. 2 southern, Philadelphia	15.00 to 15.25
No. 2 southern, Cleveland	14.35 to 14.85
No. 2 southern, New York	14.75 to 15.00
No. 2 southern, St. Louis	14.00 to 14.25
Virginia 2X, Philadelphia	15.30 to 15.55
Virginia, 2X, Jersey City	15.30 to 15.75
Virginia, 2X, New Eng., all rail	15.75 to 16.25
Gray forge (eastern Pa.)	13.75
Gray forge, Pittsburgh	13.65
Gray forge, Birmingham	9.00 to 9.50
Silveries, 8 per cent, Cleveland	17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phila.	21.00 to 21.50
Lebanon low phos., furnace	17.00 to 17.50
Low phos., Pittsburgh	21.65 to 21.90
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex-ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi, non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7 to 8c
Foreign non-Bess., 50 to 65 per cent.	7 to 8c

COKE

(At the ovens.)

Connellsville furnace	$1.75
Connellsville fur. contr.	1.75 to 1.85
Connellsville foundry	2.25 to 2.50
Connellsville fdy., contr.	2.35 to 2.50
Wise county furnace	1.85 to 2.10
Wise county foundry	2.25 to 2.75
Pocahontas furnace	1.80 to 2.05
Pocahontas foundry	2.25 to 2.40
New River, foundry	2.75 to 3.50
New River, furnace	2.20 to 2.35

FERRO-ALLOYS

Ferro-manganese, Baltimore	$100 to 125
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Bess. billets, Pbgh. and Yn.	$20.00
Open-hearth bil., Pbgh. and Yn.	20.00
Open-hearth bil., Phila.	22.40 to 23.40
Bess. sheet bars, Pbgh. and Yn.	21.00
Op-h'th sh. bars, Pbgh. and Yn.	21.00
Forging billets, Phila.	25.40 to 26.40
Forging billets, Pittsburgh	25.00
Wire rods, Pittsburgh	24.50 to 25.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh	2.00c
Track bolts, Chgo	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c
Structural shapes, Chicago	1.38c
Structural shapes, Philadelphia	1.30c to 1.35c
Structural shapes, New York	1.31c to 1.36c
Structural shapes, San Francisco.	2.00c to 2.05c
Tank plates, Chicago	1.38c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Baltimore	14½ cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Minneapolis and St. Paul	32 cents
Denver	67½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	46 cents

Tank plates, Pittsburgh	1.20c
Tank plates, Philadelphia	1.30c to 1.35c
Tank plates, New York	1.31c to 1.36c
Bars, soft steel, Pittsburgh	1.20c
Bars, soft steel, Chicago	1.38c
Bars, soft steel, Philadelphia	1.35c
Bars, soft steel, New York	1.36c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Hoops, less carloads, Pittsburgh	1.30c to 1.35c
Bands, Pittsburgh	1.20c
Shafting, carloads, Pbgh., disc. contract	65 to 66 off
Shaft'g less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	1.07½c to 1.12½c
Bar iron, Philadelphia	1.15c to 1.20c
Bar iron, New York	1.20c to 1.30c
Bar iron, Cleveland	1.20c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.25c to 1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.95c to 2.00c
No. 28, black, Chicago	2.08c
No. 28, tin mill, black, Pbgh.	1.95c
No. 28, galvanized, Pbgh.	2.90c to 3.00c
No. 28, galvanized, Chgo.	3.08c
No. 10, blue, annealed, Pbgh.	1.40c to 1.45c
No. 10, blue, annealed, Phila.	1.50c
Tin plate, 100 lb., coke, base	$3.60 to 3.75

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	73
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.55 to 1.60
Wire nails, retailers, Pittsburgh	1.60 to 1.65
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Plain wire, retailers, Pittsburgh	1.40 to 1.45
Galvanized wire, jobbers, Pbgh.	1.75 to 1.80
Galvanized wire, retailers, Pbgh.	1.80 to 1.85
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	1.95 to 2.00
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, painted, retail'rs, Pbgh.	1.60 to 1.65
Barb wire, galv., retail's, Pbgh.	2.00 to 2.05
Barb wire, galv., jobbers, Pbgh.	1.95 to 2.00

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, 3/8 x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads, 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts 3/8 x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ½ inch and larger, $7.20; 9/16-inch and smaller. $7.80.

RIVETS

Structural rivets, Pbgh.	1.50c to 1.60c
Structural rivets, Chgo.	1.68c
Boiler rivets, Pbgh.	1.60c to 1.70c
Boiler rivets, Chgo.	1.78c

SCREWS

(New York.)

Lag, gimlet and cone point.	80 and 20
Coach, gimlet point.	80
Standard Jack	70 and 10
Mch., cut thread, flat head.	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and40 and 10
Mch., rolled thread, flat head or round head.	80 and 10
Set screws, iron.	75 and 10 and 10
Set screws, steel, per cent advance over iron.	25
Square head cap screws.	70 and 10 and 10
Hexagon head cap screws.	70 and 10 and 10
Fillister head cap screws.	60 and 10 and 10
Flat head wood screws.	10 and 10 and 5
Round head wood screws.	10 and 10 and 5

CAR WHEELS

33-inch Engine truck wheels.	$22.00 to $24.00
36-inch engine truck wheels	23.00 to 25.00
33-inch tender wheels.	18.00 to 18.50
36-inch passenger train car and tender wheels	20.00 to 20.50
33-inch freight car wheels.	15.50 to 16.00

All f. o. b. Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes ..... 1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.20c to 1.25c
⅝-inch	1.25c to 1.30c
½-inch	1.30c to 1.35c
⅜-inch	1.45c to 1.50c
¼-inch	1.70c to 1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)—

	Discount.
American carpet tacks.	90 and 20 and 10 and 10
American cut tacks...	90 and 20 and 10 and 10
Railroad tacks	90 and 50 and 10
Gimp tacks	90 and 20 and 10 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, Iron and steel	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35 plain	1.17
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39 galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Three to 24 in., Cleveland	$ 22.35 to 22.80
Four-inch, water, Chicago	26.50
Six to 12 inches, Chicago	24.50
Larger sizes, Chicago	24.00
Six-inch, water, New York	20.50 to 21.50
Four-inch, water, Birmingham	19.50
Six-inch and larger, Birmingham.	19.50
Gas pipe, $1 per ton higher than water.	

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.65c to 1.70c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.60c to 1.65c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia.	1.65c to 1.70c
Shapes and plates, New York	1.85c
No. 10 blue ann. sheets, Chgo.	1.95c
No. 10 blue ann. sheets, Cleve.	2.15c
No. 10 blue ann. sh., St. Louis.	1.90c
No. 10 blue ann. sheets, Cinci.	1.95c
No. 28 black sheets, Chgo.	2.55c
No. 28 black sheets, Cleveland.	2.60c
No. 28 black sheets, Cincinnati.	2.45c to 2.55c
No. 28 black sh., St. Louis.	2.45c
No. 28 galv. sheets, Chgo.	3.55c
No. 28 galv. sheets, Cleveland.	3.60c
No. 28 galv. sheets, Cincinnati.	3.40c to 3.55c
No. 28 galv. sheets, St. Louis.	3.35c

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo.	$ 8.50 to 8.75
No. 1 railroad wrought, Cleve.	9.50 to 10.00
No. 1 railroad wrought, St. L.	7.75 to 8.00
No. 1 railroad wrought, Cinci.	8.00 to 8.50
No. 2 railroad wrought, Chgo.	8.00 to 8.25
No. 2 railroad wrought, St. L.	7.50 to 7.75
Arch bars and transoms, Chgo.	11.50 to 12.00
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup. & spr'gs, St. L.	9.25 to 9.50

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo.	11.50 to 12.00
Steel car axles, St. Louis	11.75 to 12.25
Locomotive tires, Chicago	9.00 to 9.50
Locomotive tires, St. Louis	8.75 to 9.25
Cut forge, Chicago	8.00 to 8.25
Pipes and flues, Chicago	6.50 to 6.75
Pipes and flues, Cleveland	7.75 to 8.25
Pipes and flues, St. Louis	5.75 to 6.25
No. 1 cast, Chicago	9.25 to 9.75
No. 1 cast, Cleveland	10.00 to 10.50
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.50 to 10.00
No. 1 busheling, Chicago	7.25 to 7.50
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	7.25 to 7.50
No. 2 busheling, Chicago	5.75 to 6.00
No. 1 boiler plate, cut, Chgo.	6.25 to 6.75
No. 1 boiler plate, cut, Buffalo.	9.00 to 9.50
No. 1 boiler plate, cut, St. L.	6.00 to 6.50
Boiler punchings, Chicago	8.50 to 9.00
Cast borings, Chicago	4.50 to 5.00
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.00 to 4.50
Machine shop turnings, Chgo.	5.00 to 5.25
Machine shop turnings, Cleve.	5.00 to 5.25
Machine shop turnings, Cinci.	4.25 to 4.75
Machine shop turnings, St. L.	4.50 to 5.00
Malleable, agl., Chicago	7.75 to 8.25
Malleable, agricultural, St. Louis	7.50 to 8.00
Malleable, railroad, Chicago	8.25 to 8.50
Malleable, railroad, Cincinnati.	6.50 to 7.00
Malleable, railroad, St. Louis.	7.50 to 8.00
Angle bars, iron, Chgo.	11.50 to 12.00
Angle bars, Iron, St. Louis.	10.00 to 10.50
Angle bars, steel, Chgo.	8.25 to 8.75
Angle bars, steel, St. Louis.	9.25 to 9.50
Stove plate, Chicago	8.50 to 8.75
Stove plate, Cleveland	7.75 to 8.00
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	8.25 to 8.75
Bundled sheet, Cincinnati	4.00 to 4.50
Wrought iron pil'g plates, Clev.	13.00

(Gross Tons.)

Heavy melting steel, Pbgh.	$11.50 to 11.75
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	9.50 to 9.75
Heavy melting steel, Cleveland.	10.00 to 10.50
Heavy melting steel, Cincinnati.	9.00 to 9.50
H'vy melting steel, eastern Pa.	10.50 to 11.00
Heavy melting steel, New York.	8.25 to 8.50
Heavy melting steel, St. Louis.	11.00 to 11.50
Bundled sheet, Buffalo	6.25 to 6.50
Grate bars, Buffalo	9.50 to 10.00
Grate bars, New York	5.25 to 5.50
No. 1 railroad wr'ght east. Pa.	12.00 to 12.50
No. 1 railroad wrought, Pbgh.	11.50 to 11.75
No. 1 R. R. wght., New York.	10.25 to 10.50
No. 1 R. R. wrought, Buffalo.	11.00 to 11.50
Shafting, New York	11.00 to 11.50
Pipes and flues, New York	7.00 to 7.25
Pipes and flues, eastern Pa.	9.50 to 10.00
Mch. shop turnings, New York.	5.75 to 6.00
Machine shop turnings, Buffalo.	5.50 to 6.00
Mch. shop turnings, Pbgh.	7.75 to 8.00
Mch. shop turnings, eastern Pa.	8.00 to 8.50
Cast borings, New York	5.50 to 5.75
Cast borings, eastern Pa.	8.50 to 9.00
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.50
Stove plate, (Jersey points)	8.00 to 8.25
Stove plate, Pittsburgh	9.25 to 9.75
Stove plate, eastern Pa.	8.50 to 9.00
Shoveling steel, Chicago	8.75 to 9.00
Shoveling steel, St. Louis	8.00 to 8.25
Reroll'g rails, 5 ft. & ov., Pbgh.	13.00
Reroll. rails, 5 ft. & ov., Chgo.	11.25 to 11.50
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., St. L.	11.25 to 11.50
Steel rails, short, Chicago	10.00 to 10.25
Steel rails, short, Cleveland	12.50 to 13.00
Steel rails, short, St. Louis	10.50 to 10.75
Iron rails, Cleveland nom.	13.25 to 13.75
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	14.00 to 15.00
Iron rails, St. Louis	11.00 to 11.25
Frogs, switches, guards, Chgo.	9.50 to 9.75
Frogs, switches & g'rds. St. L.	10.50 to 10.75
Car wheels, (iron), Pittsburgh.	11.25 to 11.50
Car wheels, (steel), Pittsburgh.	12.75 to 13.00
Car wheels, Chicago	10.75 to 11.00
Car wheels, eastern Pa.	11.00 to 11.50
Car wheels, Buffalo	12.00 to 12.50
Car wheels (N. J. points)	10.50 to 11.00
Car wheels, St. Louis	11.00 to 11.25
Iron axles, Pittsburgh	20.50 to 21.00
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	20.00 to 21.00
Iron axles, Buffalo	21.50 to 22.00
Iron axles, Chicago	18.25 to 18.50
Steel car axles, New York	12.00 to 12.50
Steel car axles, Buffalo	15.00 to 15.50
Steel car axles, Cleveland	14.00 to 16.00
Steel car axles, eastern Pa.	14.00 to 15.00
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Pittsburgh	9.00 to 9.50
No. 2 busheling, Buffalo	6.00 to 6.50
Low phosphorus steel, Buffalo.	15.00 to 15.50
Low phosphorus steel, Pbgh.	14.00 to 14.50
Low phos. steel, eastern Pa.	14.50 to 15.00
No. 1 forge, eastern Pa.	8.00 to 8.50
No. 1 cast, eastern Pa.	12.00 to 12.50
No. 1 cast, Pittsburgh	11.50 to 11.75
No. 1 heavy cast (N. J. points)	11.00 to 11.50
Boiler plate, Cleveland	8.50 to 9.00
Mall. iron, agricul., Cleveland.	9.00 to 9.50
Mall. iron R. R., Cleveland.	10.25 to 10.75
Malleable, railroad, Pittsburgh.	10.50 to 10.75
Mall. R. R., Buffalo	10.75 to 11.25
Mall., R. R. east. Pa.	9.00 to 9.50
Bundled sheet, Pittsburgh	8.50 to 8.75
Bundled sheet, Cleveland	7.50 to 8.00

MISCELLANEOUS SHOP TOOLS

	Discount.
Standard files	80 and 5
Heavy hammers, 3 to 5 lb.	80 and 10
Heavy hammers, over 5 lb.	80 and 5
Gas pliers, 7-inch, per dozen	$2.00
Gas pliers, 12-inch, per dozen	3.50
Cold chisels, per pound	10c to 15c
Wrenches, aligator, discount	75 to 80
Wrenches, drop forged S.	60

High-Grade Tin and Terne Plates
Genuine Charcoal and Iron Terne Plates

The Carnahan Tin Plate & Sheet Company

Canton, Ohio

Specialties → Blued and Polished Steel, Deep Drawing Steel, Automobile Sheets, Full Finished Enameling and Ceiling Stock, Etc.

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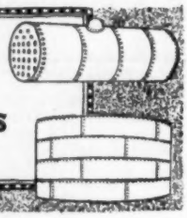
BOLTS and SCREWS
The Falls Rivet Co. Kent, O.

STEEL PLATE CONSTRUCTION
Riveted and Welded Tanks
of every description
ACME BOILER WORKS, Canal Dover, O.



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We also polish, plate or enamel these if desired.
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Making Steel Castings—II

(*Continued from page* 335.)

mosphere, air is not admitted in the electric furnace and the oxygen introduced is in a solid form, its influence therefore being under control.

The cost of installing a 2½-ton electric furnace of one of the best known types is stated to be about $20,000. The operating expense depends largely on the cost of current, consumed variously (as reported) from 400 to 1,200 kilowatt-hours on cold charges and from 250 to 600 kilowatt-hours on hot charges per ton. The electrode cost for an arc furnace averages 8c per ton. Melting loss varies from 4 to 10 per cent. Brick-work maintenance is an item of importance, as roofs frequently require renewal after making 25 heats. Time for making and refining steel varies from 3½ to 11 hours. Apology should be made for dissimilarity of certain data, which can only be explained by the small number of each of the many types of furnaces in use, and the differences in methods employed and grades of steel made even with furnaces of the same type.

It seems reasonable that this, the most expensive furnace to install, can only hope to compete with the crucible furnace, the cheapest of the melting mediums, in expense of operation for the manufacture of castings, where current is extraordinarily cheap, and that, in the latter contingency, the open-hearth has no competitor in this interesting invention. Those who contemplate replacing the crucible for an electric furnace in the foundry, should consider the following points aside from those suggested by the above data; possibility of securing higher prices for steel of exceptional purity; difficulty of maintaining minimum carbon-content in mild steels because of fragments from electrodes occasionally dropping into the bath; the adaptability of capacity, unlike the open-hearth, for steels of special composition; and the importance of the personal equation, greatest perhaps in electric melting, because of the scarcity of skilled operators. And it may be repeated that cold stock practically doubles fuel cost, hence the importance of providing hot metal, and the better adaptability for refining only. The most effective (if unconscious) exploiters of electric melting might well be said to be those engineers who specialize in hydro-electric development.

Rich Mining Region in Montana

About thirty mining districts in southwestern Montana are described in a report just issued by the United States Geological Survey as Bulletin 574, "The Mining Districts of the Dillon Quadrangle, Montana, and Adjacent Areas", by A. N. Winchell. The area described was of great importance in the early development of Montana, for it was the discovery of gold in the streams of this region that led to the influx of population and the eventual settlement of the state. The Dillon quadrangle comprises about 3,200 square miles; the great Butte copper-mining district is immediately north of it, and indeed two of the Butte smelters are within it.

The first important discovery of precious metal in Montana was made at Bannock, in 1862, and the placers of Bannock are reported to have yielded that year $600,000 in gold. A far greater strike was made in June of the next year at Alder Gulch. This discovery caused an extraordinary inrush of gold-seekers and led to the founding of a number of towns on Alder Creek, the largest of which, Virginia City, had within a year or so 10,000 inhabitants. It became at once the great center of population and the capital of the territory, but the inevitable decline soon set in, following the exhaustion

of the placers, and in 1874 the capital was transferred to Helena. Alder Gulch is the longest and richest gold-bearing gulch ever found in Montana, and within the first 20 years its gravels yielded more than $30,000,000; in fact, some authors place the output as high as $60,000,000.

Placer mining has been going on more or less continuously ever since the early days, and in late years modern methods of attacking the gold-bearing gravels have begun to be introduced. Dredges now handle the gravels of Alder Creek at an average cost of about 8 cents a cubic yard, and it is expected that with still larger dredges this can be reduced to about 4½ cents a cubic yard. The proved dredging ground will probably keep all the dredges in constant operation for about 10 years. The gold output of this fleet of dredges is larger than the total from all the mines in the region.

Though the first mining in the state was done on the gold placers, attention was soon turned to lodes. Even during the sixties some little progress was made in opening deep mines or quartz mines; but only the richest ore could be mined on account of the extremely high cost of labor and of supplies, which were brought in by wagon train, at first from Pikes Peak, Colorado, and later from Utah. In 1882 the advent of what is now the Oregon Short Line exerted a strong stimulus on the mining industry, and the succeeding decades saw the rapid development and successful operation of many mines in the region. From 1890 to 1900 the mines in Beaverhead County reached the acme of their productiveness. In recent years a decline has set in, due partly to the present low prices of silver, lead and copper. For a portion of the region, however, it seems due in part to the lack of transportation facilities. The projected Butte, Wisdom & Pacific railroad will tap certain of the districts described in Mr. Winchell's report, notably the Elkhorn and Vipond districts in Beaverhead county.

The metalliferous mineral resources of the Dillon quadrangle and adjacent areas include gold, silver, copper and lead, and smaller quantities of zinc, iron, manganese and tungsten, and their distribution, mode of occurrence, geologic features and origin are discussed in Mr. Winchell's report. The metallic ore deposits of the region occur in about thirty more or less well-defined districts, and these are described individually.

Leads in Cement Output

Washington, Aug. 18.—The bureau of domestic and foreign commerce has issued a statement showing that the United States leads the world in the production of cement, with an output approximately four times that of England and nearly three times that of Germany. The production rose from 8,000,000 barrels in 1890 to 93,000,000 in 1913. Imports have fallen from 2,225,000 barrels in 1890 to 95,827 barrels in the fiscal year 1914, with one exception the lowest reported in many years.

Exports of cement from this country go to all parts of the world, but chiefly to Panama, Canada and Cuba. Germany, Belgium, England and France, in Europe, and Canada and China in other parts of the world, are the countries from which imports of Roman, Portland and other hydraulic cement have fallen off in the last five years.

Two counties in Pennsylvania, Fayette and Westmoreland, which constitute the Connellsville coking district, had a combined production of bituminous coal in 1913 of over 65,850,000 short tons, within 10 per cent of the total production of West Virginia, the second coal-producing state in the Union, and exceeding that of Illinois by about 4,000,000 tons.

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